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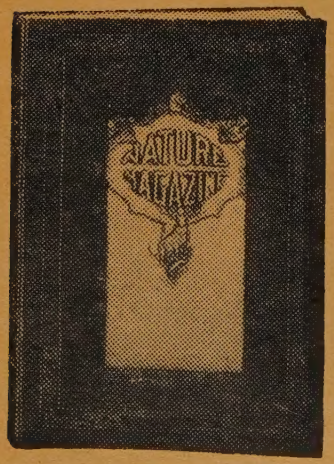


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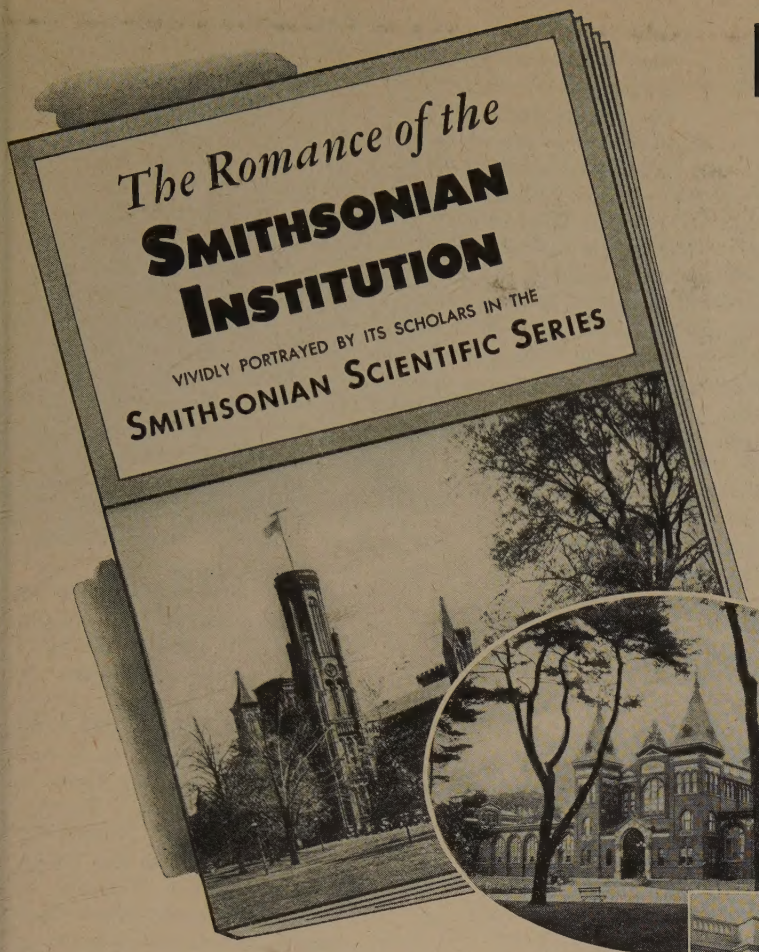


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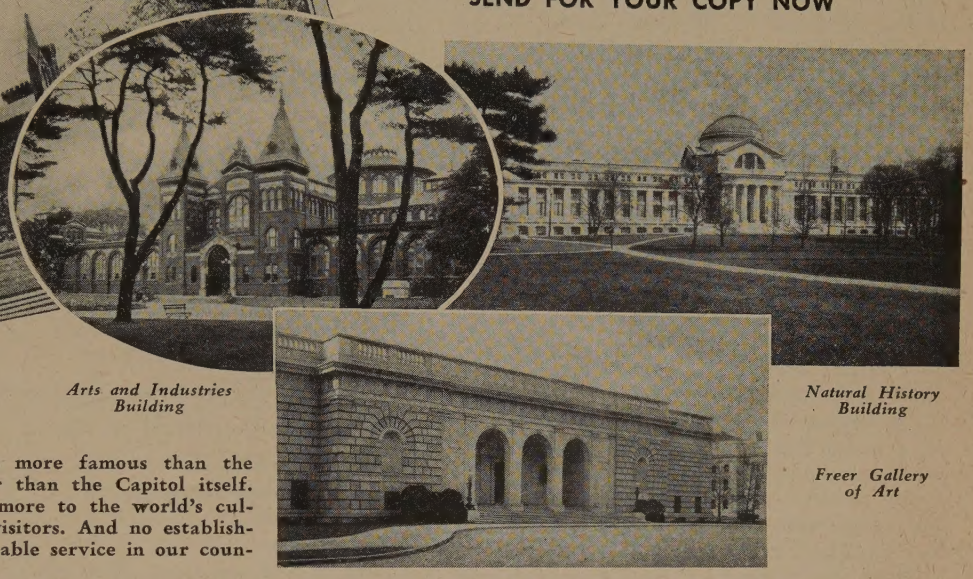

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(Nature 4-44)

# Nature in Print

*By* HOWARD ZAHNISER

It is interesting to note that the most popular use of the term "Nature" during what we sometimes call modern times—say, the nineteenth and twentieth centuries—has excluded the realm of Nature in which men have made the discoveries that are most characteristic of these times. When we think of an interest in Nature, when we talk of the Nature movement, when we hear references to Nature lovers, we may include in our concepts the wild creatures of the outdoors, the trees and other plants that grow from the soil, the living soil itself, even the inanimate rocks that lie around us or tower above us in mountains, perhaps also the sun, the moon, the planets, and stars. Yet we never think in this connection of electricity. We live in what has been called "the electrical age," a time when our understanding of the natural phenomenon or phenomena described in the undefined term "electricity" has altered our entire mode of living, and there is nothing that seems more in contrast with what we call Nature than our reminders of electricity—a whirling battery of dynamos by a waterfall, a searchlight's beam in the heavens, or spark plugs setting off explosions in the cylinders of a motor boat on an otherwise quiet mountain lake.

My secretary one morning last winter awoke to find that her electric alarm clock had stopped. She "turned on" the light switch only to be left in darkness, twisted the knob on the radio to find out what time it was yet heard nothing, thought she had capped the climax when neither the toaster nor the kitchen stove would operate, and finally achieved the ultimate morning inconvenience when the hot water ran cold and colder. If the battery in her automobile had failed, she would indeed have been quite frustrated in an age of electricity.

It was the so-called natural philosopher who was the pioneer for the modern scientist who helped us master electricity, yet our present so-called philosophies of Nature in which many things are heard of are not likely to be much concerned with the electrical appliances that upset us when they fail. Perhaps it is just as well so, and yet it has seemed during a reading of David O. Woodbury's biography entitled *Beloved Scientist: Elihu Thomson, A Guiding Spirit of the Electrical Age,* that perhaps familiarity, or maybe a too close association with what we think of as a magic, has led us into neglect of one modern possibility of esthetic wonder at Nature. Unprecedented as it may be, a review of such a book has not seemed altogether inappropriate in a Nature magazine.

Elihu Thomson had more than an amateur's interest in astronomy, and he applied his genius to the problems of optics and the use of glass in astronomical instruments. After accompanying a group of astronomers to see a total eclipse of the sun from Barnesville, Ga., he "never missed a total eclipse if he could possibly help it," even travelling across the Atlantic for this purpose. For seventeen years he made it a practice to climb a mountain in the Adirondacks or White Mountains each Fourth of July. He instructed his boys "at great length in the fascinating habits of living things. They studied spiders' webs and fishes; when they were in the mountains in the summer they scoured the woods for flowers, birds' nests and the homes of hedgehogs, raccoons, squirrels, insects, and worms." Such are the glimpses of special interest to the readers of this magazine in this biography of a man who for his eminence in a highly specialized field was indeed versatile.

And of Elihu Thomson's eminence in the field of electrical progress there can be no doubt in the mind of a reader of *Beloved Scientist.* There is in the volume a sometimes annoying adulation and an occasional suspicion of partiality where partiality is not needed, yet these are on reflection highly excusable excesses of a biographer who knew a man like Elihu Thomson. Thomson's achievements were indeed among the marvels of our time. Even as a boy he made those around him sit up and take notice. When his father scoffed at the pinprick shock he got from Elihu's Leyden jar, the boy designed a more powerful jar that threw his father, as Mr. Woodbury describes it, "into the air and landed him on his back, where he lay cursing till his wife ran in and picked him up." Throughout his career his achievements were as astounding and, fortunately, usually much more practical than in this instance.

As a young man he took out his first patent in 1876, and for almost sixty years he continued to investigate, experiment, invent, and take out patents, which, prudently managed, made him as "successful" as he was eminent. He was the Thomson of The Thomson - Houston Electric Company that eventually merged with the Edison General Electric Company to form the General Electric Company, which is one of our great American institutions today, the largest manufacturer of electrical equipment in the world. His last patent was granted him in 1935, when he was eighty-one years old.

Thomson was granted a total of six hundred and ninety-two patents, an average of one a month for his adult life. In four years of his life, says Mr. Woodbury, he was receiving patents at the rate of one a week! At least a dozen of his achievements are considered major contributions to the understanding and use of electricity. "Among them were the three-coil dynamo, electric welding, the cream separator, alternating-current distribution, the electric meter, the repulsion motor, the oil-immersed and other types of transformer, the magnetic blowout, basic inventions in trolley-car and train control, lightning arresters, and fundamental improvements in X-ray tubes and high-frequency radio apparatus," according to Mr. Woodbury.

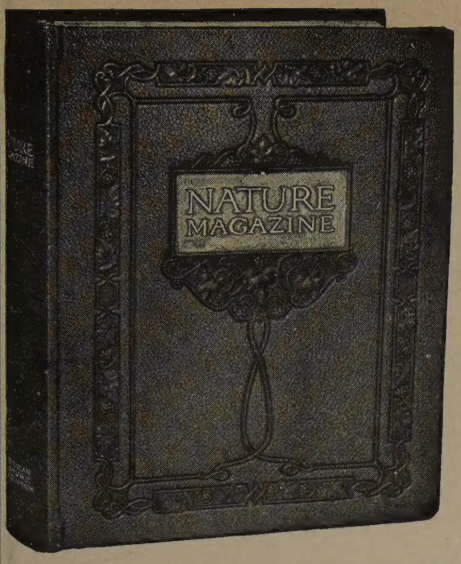
This biography is indeed inspiring, not only because of the possibilities for achievement that it demonstrates but also because of the estimable character it reveals. Thomson helped create the age in which we live, and yet of course it is also true that this age created him. In an earlier time his genius might have expressed itself in ways that might have seemed more pertinent to our interests in the world of living things. One of his colleagues did, in fact, declare "that had he chosen any branch of biology he would have become equally distinguished;" and if so, who knows but that we might be thinking of him as a relief from the high-strung civilization which we now attribute in part to him.

A reading of Elihu Thomson's biography suggests also that in a contemplation of the natural laws discovered and applied by the makers of our civilization there is somewhat the same relief from the superficial distractions of current living that comes with a contemplation of other aspects of Nature. Finally there is a thought worth catching from an address made by Thomson himself when speaking before the Franklin Institute

# Mantis Sinensis

*By* CHARLES E. GAPEN

I am moved by the fantastic intelligence
That makes the mantis sway like lifted leaves;
That stops his sticklike form in adamantine green—
And to the end that this voracious oriental,
Arrayed like a slender mandarin,
May have protein fitted to his deliberate mechanism.
How right that, after all, he should be eaten
By his precise, more precious mate,
Brought up by God to clean her plate!

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*Beloved Scientist: Elihu Thomson, A Guiding Spirit of the Electrical Age.* By David O. Woodbury. New York and London: Whittlesey House, McGraw-Hill Book Company, Inc. 1944. 358 pp., with foreword by Owen D. Young, 20 illustrations on 16 plates, bibliography, list of medals and decorations, and index. $3.50.

### Cooking in the Wild

The Outdoorsman's Cookbook. By Arthur H. Carhart. New York. 1944. Macmillan. 211 pages. $1.95.

Here is a practical book for anyone who goes into the outdoors for sport, recreation, or as a part of his work. It is written by an experienced outdoorsman who seems to have overlooked nothing that might be useful. Following chapters on mapping meals in advance and on the fire that will cook them, he discusses a wide variety of dietary items from wild meats to camp desserts. There is a chapter on edible wild fruits and vegetables, and another on famous recipes for the preparation of wild game dishes. This is a book that should have a wide audience.

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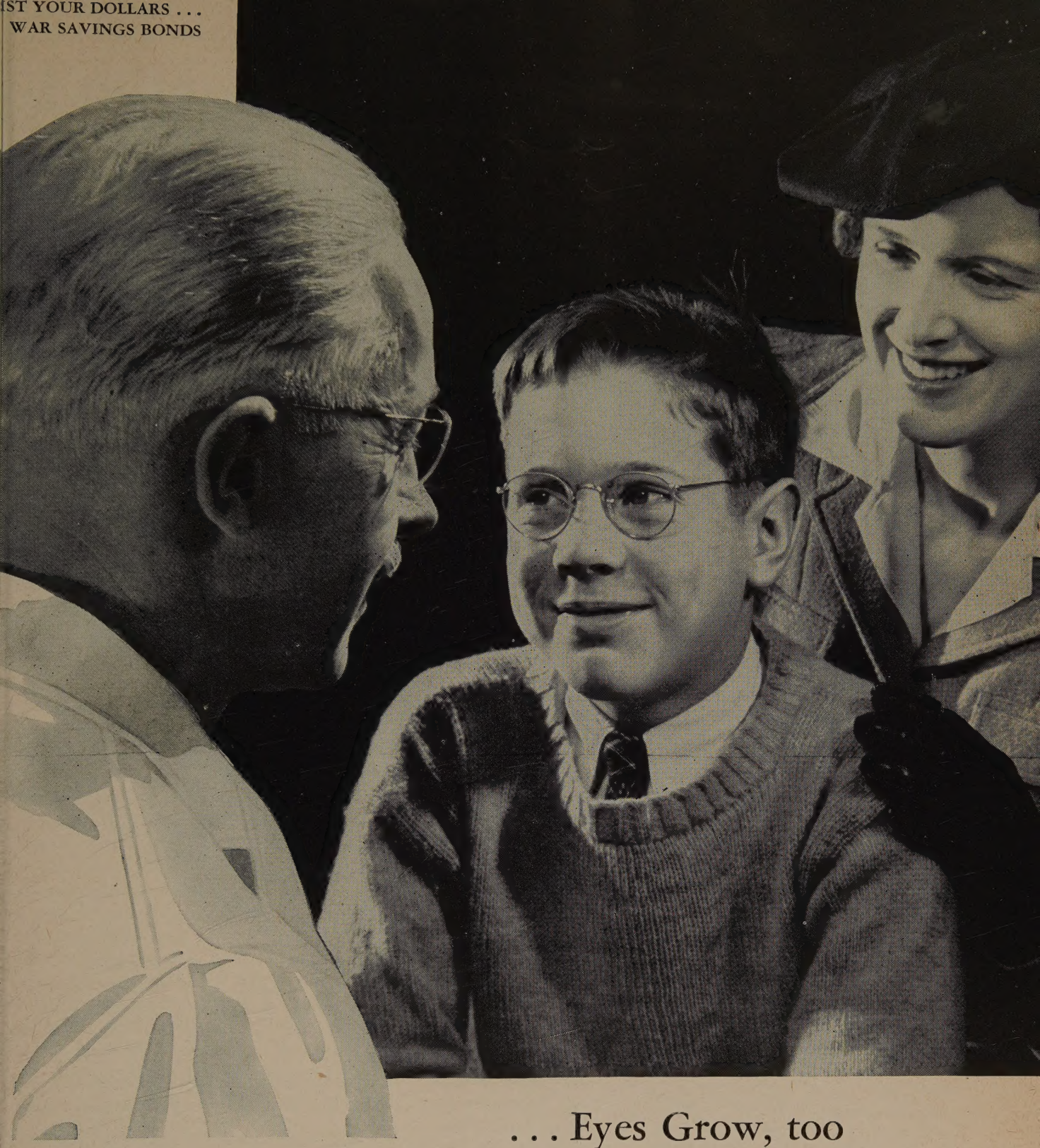

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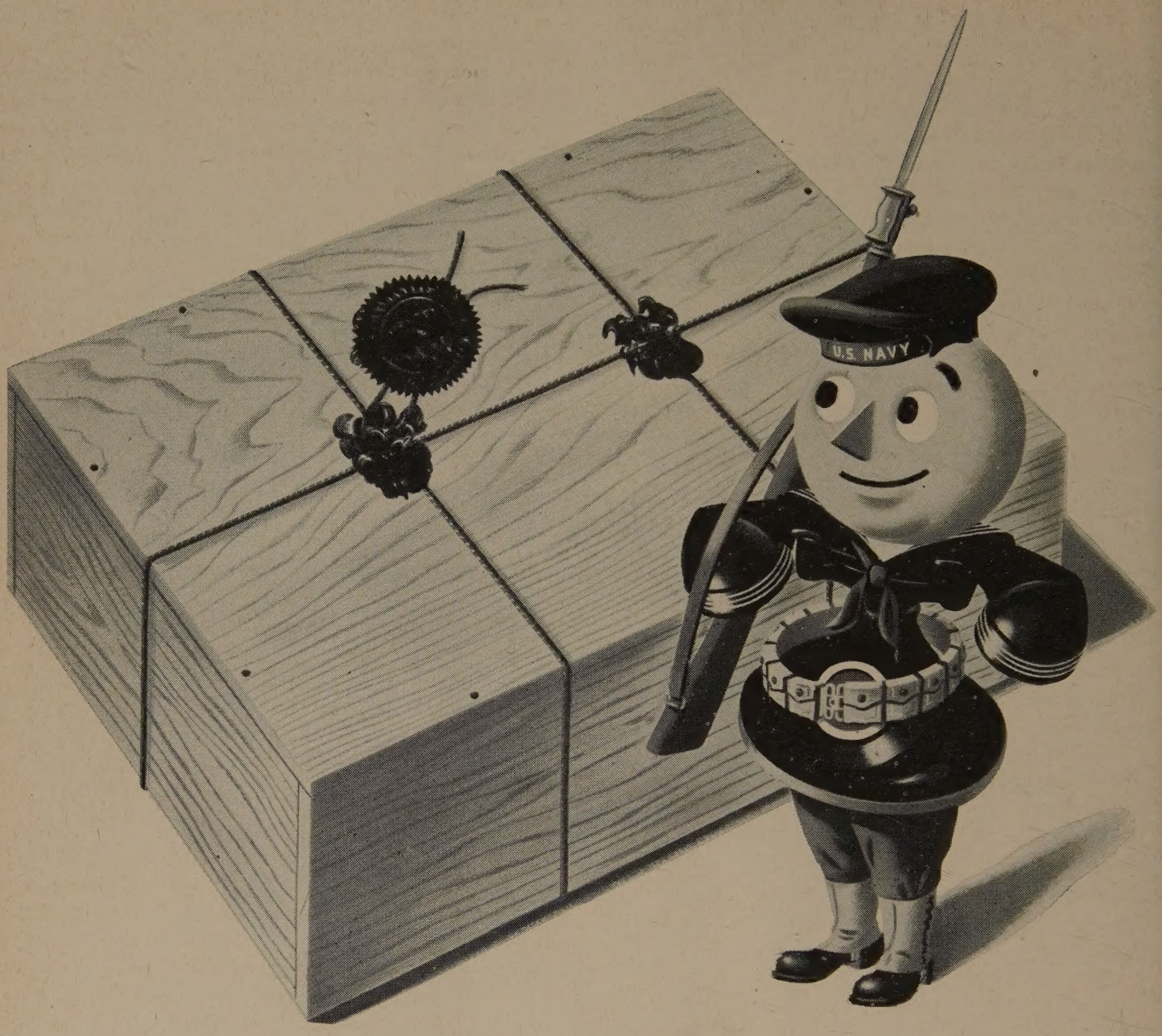


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# Contents Noted

Major General Edmund B. Gregory, Quartermaster-General of the Army, let himself in for some unpopularity with the ladies but for a vote of thanks from many husbands—and all our fur-bearing animals—in a recent article in *This Week*. Writing about things the Army has discovered, and which bear on the future, he says: "We have found that several light layers of cotton and wool will keep a person warmer than fur. So the old argument that the lady of the house needs a fur coat to keep her warm no longer holds. All she needs is a coat made with an outer shell of windproof cotton and a lining of wool. Commercial manufacturers can give her all the style she wants—and the prices will be low." *Vogue* and *Harper's Bazaar* please note.

It grieves us when we slip up in accuracy, but it is probably as well that we do now and then because it emphasizes the continual need of vigilance. So we blush as we apologize for letting the impression get about that nothing is known about how the infant kangaroo or wallaroo gets into mama's pouch. See the wallaroo article in our January, 1944 issue. An obliging reader calls our attention to the fact that the baby gets there "under its own steam," crawling through its mother's fur to the pouch and attaching itself to a teat. The whole operation was described about eighteen years ago in an Australian scientific journal, yet the impression is still current that it is a mystery. This is not surprising when we consider that the same gymnastics long remained a mystery with respect to our own and only North American marsupial, the opossum. Although under almost daily observation by thousands of people, it was more than three hundred years before this simple item of the life history of the 'possum was actually observed.

One of the fine things about Science is that it does not stay in a rut. For centuries man was convinced that magnetic current was not worth a hill of beans, then along comes a scientist with convincing proof that it is important. For a long time scientists have believed that the true horse originated in North America and later spread to the Old World, becoming extinct in America relatively recently, as geological time goes. Now comes Paul O. McGrew of the Chicago Museum of Natural History with evidence that the horse went through most of its evolution in North America, and about four million years ago the family Equidae (which includes horses, asses and zebras) had divided into several groups. One of these was to develop into the true horse and the other into the ancestor of the zebra. The horse ancestor migrated to Asia a mere three million years ago, later to develop into the modern horse. The other ancestor stayed here and evolved into zebras, later spreading to Asia, Europe and Africa, and finally becoming extinct in all but Africa. The true horse spread throughout Europe and into North and South America, but something (still unexplainable) went wrong and horses became extinct in the Western Hemisphere before the white man came. Furthermore, Dr. McGrew says, the now extinct American zebras were probably striped like the African ones, and stripes are not the important distinction between horses and zebras, anyway. Just give Dr. McGrew a lower milk tooth and he will tell you whether it is from a horse, ass or zebra. The Museum has brought out a report of the paleontologist's findings, which it describes as in "technical (and, to most people, unintelligible) form. . . ."

*Department of Conservation Confusion:* Recently the California State Fish and Game Commission passed a resolution urging the WPB to permit the manufacture of more shotgun shells and sporting ammunition. One of the whereases of the resolution pointed out that "the reduction of hunting effort caused by this shortage of shotgun and rifle shells is a contributing factor to undue increases in flocks and herds because it has been impossible to crop off the annual surpluses." Recently, also, Drew Pearson, in his syndicated column, painted a word picture of hordes of animals and birds eating up the farmers' crops. Unhampered by facts, his column gave the impression that the average farmer has to push his way through ranks of deer and other hungry animals to get out to the barn to do the milking. Yet Ira N. Gabrielson, Chief of the United States Fish and Wildlife Service—also recently—told a conference of conservationists that while there has been some increase in wildlife populations it has not been as great as many think, and is not universal. The falling off in hunting pressure has been much less than anticipated, and has even increased in some States—twenty percent in one State. There has been more "meat hunting" and less recreational hunting, he said, and the pressure is markedly up where war industries have been in operation.

R. W. W.

**Saracen's Tent in the Caverns of Luray in Virginia. In these famous caverns workmen were blasting to shorten a roundabout route when they uncovered traces of one of the oldest campfires. Photograph from the General Electric Company.**

*Tireless exploration continues to yield up evidence that sheds light on—*

# The North American Caveman

*By* ANNA DICKERMAN

FIRST a drop; then a trickle of rain through a limestone crevice; a widening, sand-laden stream cuts its way in swift descent; then a rushing underground river—and the making of a cavern is under way. It is one of the most patient tasks to which Nature assigns herself. Millions of years pass, but she is tireless. Then to the eternal night of the cavern comes man, bringing light, and the mysterious, silent depths yield secrets of the past and of the very infancy of the human race.

There is a cave in Europe in which age has reduced the bones of men and animals to mingle in common dust, so that they are carried away by cartloads to be used as fertilizer. Caverns of the United States yield evidence that man occupied this continent twenty thousand years ago, possibly much earlier. His remains have been found in association with animals of the Pleistocene, the geological epoch just prior to our own. We may yet learn that the world's oldsters were Americans.

Cave exploration is so important, as well as fascinating, that after the war-weary world gets back to peacetime pursuits, keen-eyed aviators will search from the skies for undiscovered caves whose entrances cannot be detected, save by chance, from the ground. Or they may be found by such luck as led "Cowboy Jim" White to Carlsbad Caverns, when he observed a "column of smoke" rising out of the mountainside. Before his astonished eyes the smoke resolved itself into astronomical numbers of bats, in flight from the caverns on their nocturnal hunt for food.

"Cowboy Jim" has often been asked if he found any evidence of prehistoric life while touring the caverns, companioned only by a Mexican boy. He replies that as he sat on a ledge to rest after a breath-taking climb, he swung his torch to gaze over the rocky chamber, and was startled to discern in the wavering light, casting grotesque shadows, the skeleton of a man. The bones, which seemed above normal size, crumbled at his touch, but he placed the skull in his grub-bag and brought it to the surface. A second skeleton was later found beneath a twenty-foot deposit of bat guano, where it had reposed for so long that conjecture as to its age was futile.

In June, 1935, two young CCC workers were exploring a section of Mammoth Cave, Kentucky, on their own time. Edging hand by hand across a ledge, they felt a substance unlike the rock, and focused their flashlights on the skull of a prehistoric miner whose body was partly covered by a limestone boulder that had fallen and trapped him. He wore a loin-cloth of woven fiber and had carried a bag of the same material. Why he had penetrated so far into the cave—fully two miles from the nearest known entrance—and what he had intended to place in the bag, will forever remain the merest guess. A bunch of reeds with blackened ends was still upright

**The Giant Dome in the Big Room of the Hall of the Giants, Carlsbad Cavern, New Mexico. This is the largest stalagmite thus far discovered, sixteen feet in diameter and estimated to be sixty million years old. Department of the Interior photograph.**

**Entrance to Moorehead Cave on the Pecos River in the Big Bend section of Texas. It was explored by Frank M. Setzler of the staff of the Smithsonian Institution. It is the mystery of the unknown that lies beyond the cave entrances, and which is suggested by this picture, that lures the cave enthusiast into the darkness.**

in the sand nearby, where the explorer had thrust it.

The vast Kentucky caverns have yielded blunt-edged pecking hammers; torches of fagots dipped in bear fat, bound together with strips of bark; crude utensils made of gourds; corncobs; watermelon and sunflower seeds; shreds of the oldest tobacco in existence. Great Salts Cave, named for its immense deposits of chemically-pure Epsom salts, is particularly rich in finds, but the slightest movement on the part of an explorer dislodges particles of the salts and brings about a choking, blinding blizzard, which discourages activities.

Centuries ago an Indian squaw turned a jar upside down in a cave in the Susquehanna Valley, New York. Probably she wanted both to keep out dirt and to prevent animals from investigating the former contents. She did not return for it, and recently a hunter found the jar intact and turned it over to the Rochester Museum of Arts and Sciences. The authorities pronounce it to be the largest known Iroquois-Indian pottery jar.

A piece of crudely-polished bone, two and one-half inches long, may be the slight evidence pointing to an Indian culture in the Hudson Valley a thousand years older than the next earliest now established. The bone strip is a fish gorge, three-sixteenths of an inch wide in the middle, and tapering to a sharp point at each end. Primitive fisherman baited the ends, attached a line to the middle, and when the fish took the bait, a jerk on the line wedged the gorge crosswise in its mouth so that it could not break free. This was found in a rock shelter near Lake Cohasset. In another small cave near Goshen, New York, a green slate bannerstone, shaped like a butterfly with rounded wings, was recently found. At a four-foot level beneath the surface, hundreds of animal remains disclosed the presence of elks' teeth.

Workmen blasting a passage in the Luray Caverns, Virginia, to shorten a long, roundabout route, came upon traces of one of the oldest campfires in the world. It lay several feet below a deposit of travertine, which is a light, yellow, porous rock formed as the water of springs evaporates. In clearing away the debris from the blast, evidence of the campfire was removed. The age of the travertine indicates that man inhabited the eastern seaboard at a remote period.

Marvel Cave in the Ozarks has a "Dead Animal Chamber" containing the mummified remains of animals long extinct. A pair of raccoons was found in this chamber, curled up as if asleep. Brought to the light, they were found to have orange and black markings instead of today's white and black, and were identified as a Pleistocene species. Marvel Cave was said to be the burial place of Spanish treasure, which lured a party of ex-soldiers of the Civil War to make a search. Their leader, Captain Truman Powell, saw possibilities in exploiting the cave, filed homestead rights, and became owner. He personally explored forty rooms and thirty-five miles of underground passages.

WPA workers located a rubble-filled cave high in the side of a cliff on the Mississippi bank near St. Paul. They brought out skeletal remains of giant beavers, dating from the last ice age.

Numerous sites occupied by American cavemen have been discovered in the Big Bend National Park area of West Texas. Excavations will take many years, but thus far, sandals woven of yucca leaves, bits of matting, basketry, wooden dart throwers used as

weapons, and a curved throwing club for hunting small game, have whetted the curiosity of archaeologists. It has not been determined whether these people—who must have been numerous—mingled with another racial group, or whether they were blotted out by war or pestilence.

A number of caves in the extension of the Dinosaur National Monument, Utah, were the abodes of prehistoric man. They have revealed granaries, or cists, of stone, laid with mud mortar; places for grinding corn; a set of knitting sticks, a boll of cotton, and many artifacts of stone and bone. On some of the cave walls are strange written characters, and pictographs. These early Utahans were of a high order of intelligence. Near Salt Lake there are traces of a civilization that antedates the Pueblos, Basket Makers, and even that of the still older Folsom man. In Black Rock Cave, which became habitable when ancient Lake Bonneville receded, the skeleton of a baby was unearthed.

Under the great curving roof of a cave in the sandstone cliffs of Arizona, a settlement of American Indians flourished 1600 years ago, according to data furnished by the Tree Ring Laboratory at Tucson. These Indians excelled in spinning, weaving and woodworking. Much of their handicraft has been preserved and placed in safekeeping. Two flutes, well made of box-elder, lay in the dust of the centuries and have caused this to be named Broken Flute Cave.

Dr. Emil Haury, anthropologist of the University of Arizona, states that nearly seven thousand years of human history in the Southwest are disclosed in chronological strata in twelve feet of debris beneath the floor of a cave on the Papago Indian reservation. Nine mummies were found in the cave, one of which had a wooden plug, an inch and a half long, through the nose septum. These men had been medium to small in stature, of slight build, with small bones, mongoloid features, round heads, and low, sloping foreheads.

Life of the cavemen in what is now south-central Oregon was interrupted by the volcanic eruptions during which famed Crater Lake was formed. Human bones have been found under the pumice, and more than seventy sandals made of shredded sagebrush bark, all of them charred, have been uncovered.

The Aleutian Islands, of Alaska, are volcanic in origin and abound in caves, many of which contain mummies. Mummification consisted in removing the organs of the body, drawing the knees beneath the chin, lashing the body to retain this form, and drying it. The warped body was then placed in a crude sort of frame and the whole was wrapped in sealskin, if available. Some of the mummies wear ceremonial masks. Others are clad in armor made of cedar rods fastened with sinew.

A group of archaeologists crawling through a cave in the Sandia Mountains near Albuquerque, New Mexico, came upon the claw of a giant sloth. This prompted them to make further investigation, and they located a hearth with the blackened fragments of a camel jaw beside it. There were also dart points among bones of other extinct animals, bone splinters broken for the marrow, and scrapers and knives of flint. The flint points correspond with some of the earliest types found in America. Sandia man has the claim to distinction of being the oldest North American.

Among the most publicized caverns within the borders of the United States is Gypsum Cave, a few miles southeast of Las Vegas, Nevada. It is a mere hole 2000 feet up the mountain side, where remnants of the beginnings of civilization came to light during a mining development. Under four feet of gypsum, a claw, bones, shreds of hide and bunches of tawny hair of the ground sloth thrilled the discoverers.

**Sandals, a bag of net, and ancient corn cobs found in the exploration of Salt Cave Number One, St. Thomas, Clark County, Nevada. Such relics as these give us clues to the American cavemen of a bygone day and help us to reconstruct the story of the past. Photograph by courtesy of the Museum of the American Indian.**

The initial thrill was mild compared with those that followed when it became evident that an entire herd of these cumbersome animals had used the cave as a shelter. The sloth lived in jungles and forests, and when food supplies on the ground were not adequate for its herbivorous diet, it was able to rear itself to its hind quarters and dine on the lower branches of trees. Having only its formidable claws for defense, it fell easy prey to the dreadful saber-tooth cats and other beasts of its day.

Artifacts were found in almost direct association with the sloth bones, and there could be no doubt that ancient man had occupied the cave at the same period. Among the archaeological treasures taken from Gypsum Cave were dart shafts in good preservation, some of them four feet long and decorated with green and red mineral paint; twine of yucca fiber and bound feathers, which may have been used on prayer-sticks that primitive hunters thrust into their prey; a flint knife with a wooden handle still held together with pine pitch; gaming dice; a pair of flutes, and fragments of basketry and pottery.

**Two types of arrow points found with the bones of extinct mammals. Left, a "Folsom" point; right, a "Gypsum Cave" point. Southwest Museum photo.**

It is a long stretch of imagination from the electrically-lighted cavern, with every convenience and safeguard for the tourist, to the unexplored cave in which the eager archaeologist performs dangerous and back-breaking labor for the sake of adding stray items to our scant knowledge of the men of antiquity. For example, F. M. Setzler of the U. S. National Museum had reason to explore a Texas cave. Mr. Setzler, with four Mexican assistants, crawled twenty feet through a passageway only two feet high, encountering scorpions and rattlesnakes. They excavated nine feet of dirt in a limited space and formed a bucket brigade, passing the diggings from one man to another until they could be sifted in the light of day. All this was done by the feeble aid of flashlights. They were rewarded by the finding of a primitive cradle and other artifacts differing from any known type.

It is probable that a great many caves of unusual interest and importance remain to be discovered, and the merest chance may reveal an unsuspected entrance. One cavern, which in prewar times attracted 100,000 visitors annually, was detected when cows forsook the shade of trees in their pasture on the hottest days and stood in the open, close to a ledge of rock. The owner of the land, a farmer, investigated, and his fortune was made.

★

# Ologically Speaking—*By* RUTH CORBETT

In alphabetic order the "ologies" we scan,
With Anthropology we start with Homo, meaning Man.
Biology next finds its place in the scientific list;
Probing into life lines, there's little it has missed.
Conchology deals with shells, as those of the seven seas.
Demonology treats with demons, and spooks one never sees.
Ethnology divides us into races, a very clannish affair.
Fossilology, an old-time name for a paleontological flair.
Geology, through rocks and stones, probes the secrets of the earth;
The why, and also the how come, and tracing the time of birth.
Herpetology—troublesome name—deals with the reptile things.
Ichthyology treats of fishes, and tales a fisherman brings.
Japanology has of late become a military calling.
Koniology is concerned with germs and dust that's falling.
Lithology classes rocks and shales, putting each one in its place.
Mythology gives us stories that were told to a primitive race.
Nomology deals with the science of law, an effort to make us pure.
Ornithology classes all the birds so we'll know each one for sure.
Paleology studies the antique thing; there are those who call it junk.
Quinology deals with cinchonas, and with treating malarial funk.
Rhabdology seeks with rod and staff the future to divine.
Sociology treats with human traits toward others of our kind.
Technology tries to explain to us, terms scientific and why.
Uranology deals with the sun and moon, and everything in the sky.
Volcanology treats with fireworks spouting from the ground.
But coming now to "W" no "ology" can be found.
Xylology deals with the grains of woods, the structure of a tree.
Yankology, to stretch a term, is being taught to the enemy.
Zoology studies the animal world, all the way from slug to ape;
When linked together by Darwin, shows Homo as just an escape.

*Although the rules frown upon them, the morale of fighting men is aided by—*

# Sea-Going Mascots

*By* W. J. BANKS

WHERE Skippy came from nobody knows—officially, at least. A stoker just "found" him behind his kit bag one morning, after shore leave. Within a week, nothing went on above or below decks that Skippy did not know about. The pint-sized terrier ruled that destroyer on Atlantic convoy duty as if he were the "old man" himself.

"He jumps barking from bunk to bunk to wake us up in the morning," says an able seaman. "When hands fall in for morning duties, he's there, and he turns up for divisions, liberty boats and all routine calls. He goes up and down the ranks, barking everybody into line, then runs over to inform the officer of the day that all are ready and accounted for."

Few war or merchant ships are without at least one mascot, most often a dog or a cat. One in a thousand may turn out to be a hero in an emergency, and the average seaman's pet may be as much trouble as he is worth, if you want to work it out on paper. Yet the mascot is a morale builder in any man's war.

There is Homer the Outlaw, for instance. This handsome springer spaniel holds a duly registered fourth mate's certificate in the merchant marine. He insists on sleeping on the officers' bridge, and shares watch with the first mate, who has made him a special life preserver. He needed it, too. Once he spent several days in a lifeboat with his shipmates. On another occasion a torpedo interrupted Homer's dinner, and when picked up later he still firmly clutched his bone. The ship was ready to sail one day when the men discovered that Homer was A.W.O.L. It began to look as if nothing could persuade that crew to cast off until the "fourth mate" turned up, which luckily he did just at the last moment.

Officially listed and drawing rations as Ordinary Seaman Sabo, the cocker spaniel mascot of a Canadian destroyer is so named because of an amazing ability to sabotage food and gear. Like many of his human comrades in the British navies, Sabo sleeps in a hammock, specially built to size. After one very hot and noisy sea fight, nobody could find Sabo, and his friends feared he had been killed or swept overboard. Then someone went below decks and found him snoozing in his "mick," where he had slept peacefully throughout the entire action.

The same ship boasts a cat of unknown origin, but whose kittens, arriving in due course after a visit to an Irish port, are definitely Hibernian. The advent of a new litter is occasion for rejoicing on shipboard, and sailors watch over the family solicitously. The ship's rodents always keep a cat well employed

**Men occupied "foxholes" in the grim battle on Attu in the Aleutians, and foxes were found in holes, too. From one of these came this little fellow who shipped out with Storekeeper 3/c R. E. Kailey of Denver. Official U. S. Navy Photograph.**

in its spare time, and the cat truly earns its keep.

Cats seldom show fear of gunfire. Binky, a black feline born in a ship's engine room, has been promoted by the wardroom to petty officer's rank for "bravery and devotion to duty" on an anti-submarine craft. The detonation of depth charges does not bother her in the least, and when enemy aircraft appear she remains on deck by the gunners, "spitting and swearing defiance as the shells burst."

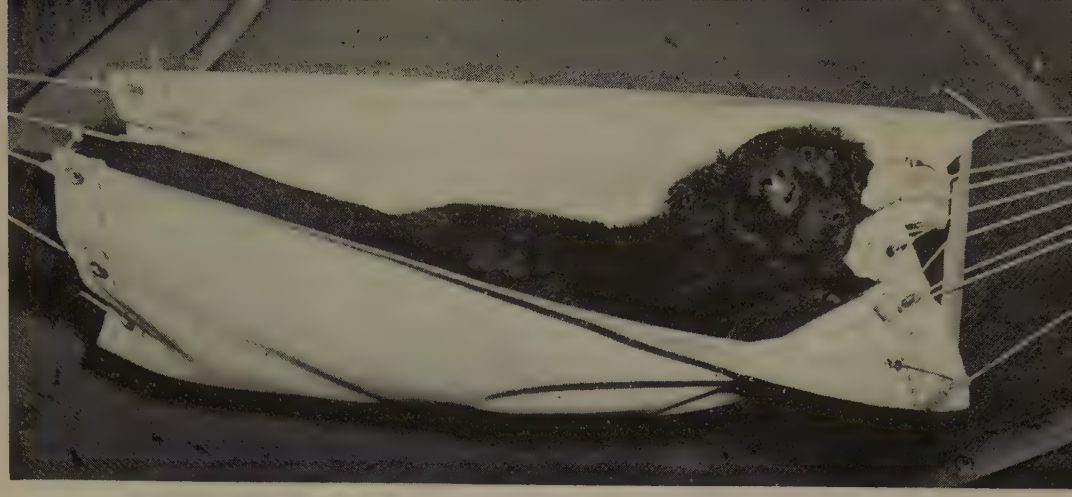
Daisy, a ship's dog on a Norwegian freighter, wears a collar with a silver plate on it inscribed "For Courage." It was truly earned after a torpedo had exploded the boilers of the ship and those members of the crew still alive were swimming about in the dark and icy water. Daisy went overboard, also, and, although she was the captain's dog, she felt as responsible as he for the men. She swam from man to man, staying for a bit with each one, licking his face and encouraging him with a cheerful bark. She kept this up for two hours and until the survivors were rescued. The sailors said that Daisy's warm tongue and helpful bark gave them hope. Two of the ship's officers were on hand when the collar was presented to Daisy by Major Lord Ravensworth of the Newcastle Branch of the Royal S.P.C.A.

Many men have risked their lives to rescue ship's mascots. Off North Africa, an explosion rocked a vessel lying near a U. S. transport. Oil gushed over the water, and fire threatened to engulf both ships. Queenie, the mongrel mascot of the transport, fell overboard in the confusion. No one saw the dog, struggling and choking in the oil, until the transport started to pull away. Private Norman Clark of Hammond, Indiana, headed for the rail. His comrades tried to hold him, yelling that the ocean would be a mass of flames any minute. But Clark dived in and plowed through the muck. Queenie clawed her way to his shoulder, and it took the sailors nearly half an hour to get the exhausted, oil-soaked pair back on board.

A black cat named Oscar is perhaps the luckiest feline that ever put to sea, having been rescued after three ships, each of which has made history in this war, sank under him. Oscar is German-born, but obviously an anti-Nazi since he is now a loyal Jack Tar of the Royal Navy. His change of allegiance took place after he lived through the frightful pounding suffered by the *Bismarck*, and was found afloat on a piece of timber and picked up by crew members of the British destroyer *Cossack*.

Then the *Cossack* went down and after his second ducking Oscar transferred to the aircraft carrier *Ark Royal*. When that brave ship finally went under, sailors returned to the doomed hulk, at great risk to their lives, to rescue the ship's cats, among them Oscar. For this deed the Dumb Friends' League gave

**Wherever the Marines land they get their Japs but they also seem to be able to find pets. Bloody Tarawa was no exception, and after the fighting had died down this Marine found a kitten that had survived the ordeal, and appreciated a drink given under a wrecked tank. Official U. S. Marine Corps photograph.**



Ordinary Seaman Sabo slept serenely in his "mick", or hammock, all through a hot naval action. He sails the seas in a destroyer of the Royal Canadian Navy, which supplied this photograph.

its highest award, a silver medal, which is being held until a new *Ark Royal* goes into service. The inscription reads: "To H.M.S. *Ark Royal*, to commemorate the bravery of the men in saving, at personal risk, the ship's cats of H.M.S. *Ark Royal*, sunk by enemy action in 1941."

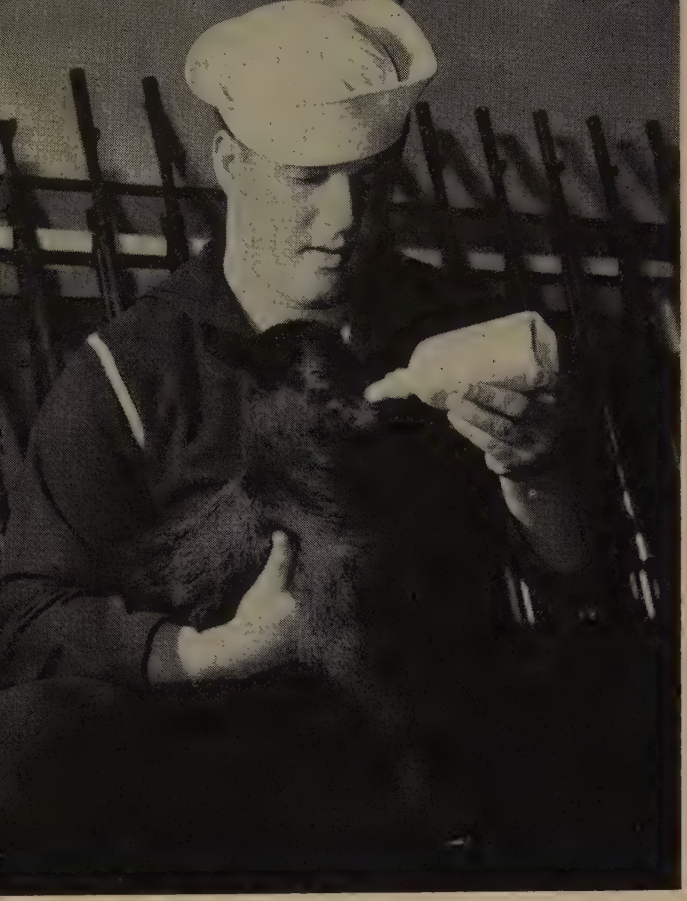
The sailors' care for their pets is repaid by the loyalty and devotion of the mascots themselves. Well known throughout the U. S. Navy is the story of the canine pet of the U.S.S. *Washington*.

Somehow, the dog was left ashore when the battleship steamed away after a call at the port of Callao, Peru. For four months the little fellow haunted the waterfront, waiting for a glimpse of "Old Glory" and the uniforms of Uncle Sam's seamen. Finally the U.S.S. *South Dakota* put into port, and the dog, frantic with joy, leaped aboard the first boat to put out to the ship.

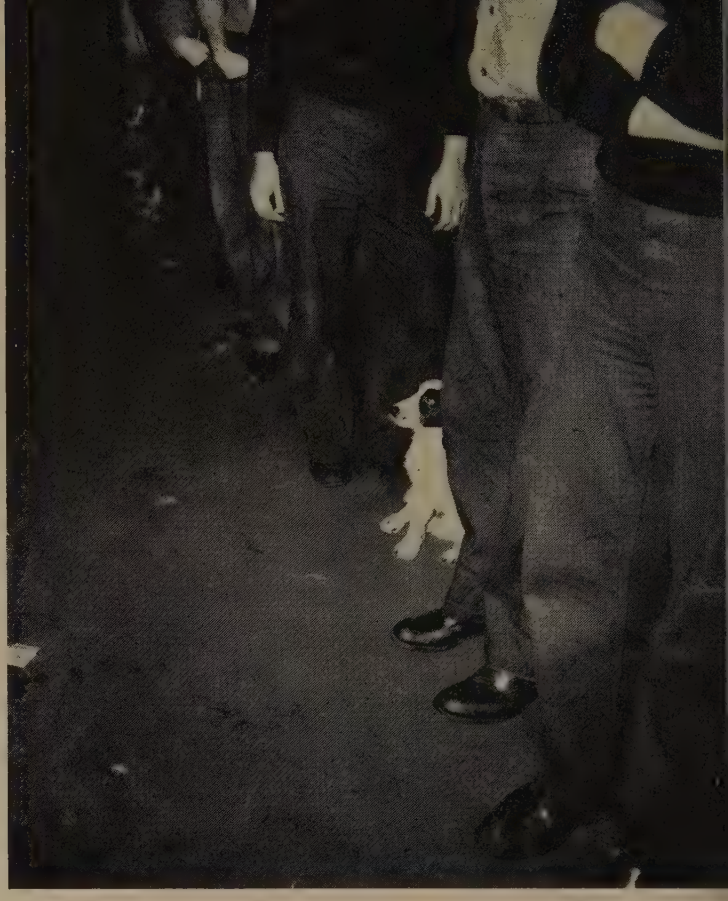
Soon he had established himself as a full-fledged member of the *South Dakota's* establish-

This well-mannered and well-dressed mascot of a U. S. Navy air squadron poses with one of his favorite pilots. He wears his wings and his rating proudly. Official U. S. Navy photograph.

The arrival of kittens is an occasional, but still quite special event on board this Canadian warship. The welfare of the new family is a special concern of the crew. Royal Canadian Navy photograph.



Geraldine is just not hungry and is a picture of serenity and dignity against a warlike background of instruments of battle. She and her pal, Seaman 2/c G. W. Burrows of Geno, Nebraska, are stationed at the U. S. Naval Operating Base at Londonderry, Ireland. Official U. S. Navy Photograph.



Mr. Chips lines up for chow with his fellow seamen on board a Navy transport. Chips made a landing during the action at Attu, but when his shipmates went ashore at Kiska he stayed on board as though he sensed that this landing would be an anti-climax. Official U. S. Navy photograph.

ment. He went ashore with his shipmates when the battle-wagon put into various ports, but stuck closer than a brother and took no chances on being left behind again. Then, six or eight months later, the ship returned to a California navy yard. There, in drydock, was the U.S.S. *Washington*. And did that dog make a beeline for his "own" ship? In no time at all he had reclaimed his old quarters and greeted long-lost buddies with yelps of delight.

Mascots are not supposed to be a part of the personnel of fighting outfits, asea or ashore. Official rules regard them as impedimenta likely to interfere with the efficient performance of his task by soldier, sailor or marine. But, somehow, these pets

Skippy is the self-appointed mascot of a new Canadian destroyer. Scanning the waves with his lieutenant, he shows that he is boss of the ship, which, in a way, he is. Royal Canadian Navy photograph.

turn up in the ranks, and because officers recognize their morale value and like pets themselves the rules often are quietly and wisely ignored.

One such mascot is "Mr. Chips" who was picked up by a member of a U. S. Navy transport. Smuggled on board, he was later discovered by the ship's executive officer and ordered ashore. His new-found friends went on the carpet for Chips—as the officer probably hoped they would—and their eloquent pleas won him a place in the ship's company. Chips developed into a true sea dog. When the attack on Attu came he went ashore and took part in that grim business. His ship was also in the convoy that "attacked" Kiska. Chips sensed

(Continued on page 220)

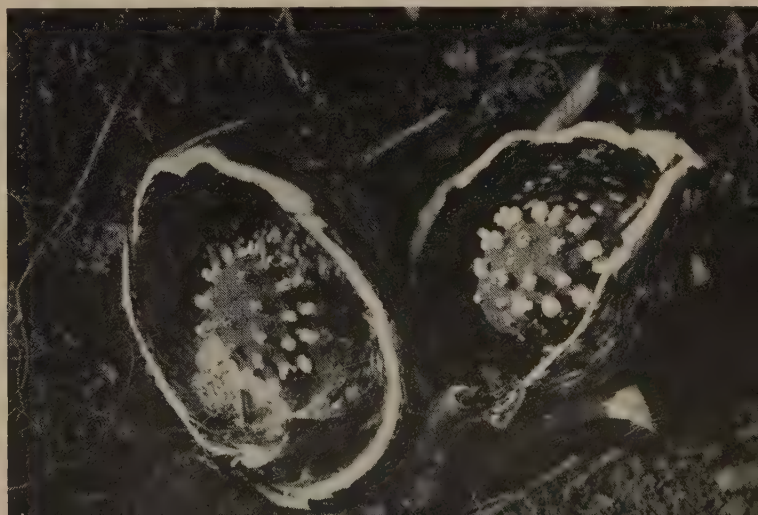
# Skunk Cabbage—"Resplendent Pioneer"

*By* M. R. ROSSE

In the North March is more often than not a month of dour weather. Raw winds blow with bite in them; sullen clouds are likely to blanket the sky; frost still lingers in the ground. We know that spring just *must* come soon, but on many March days it still seems far away—still a hope, not a certainty.

Yet those who know the outdoors are sure that they may look with confidence for a certain advance scout of the floral army, whose other members are still awaiting orders from April and May, with their showers and warming sun. This plant that reassures us that spring is not far away—this "resplendent pioneer," in the words of the poet who pays it tribute—is the ill-named skunk cabbage. *Symplocarpus foetidus* to the botanist, it is the true harbinger of the new season, a humble and sturdy growth that often thrusts its way toward the sky

**Above are two clumps of the leaves of skunk cabbage, two weeks or so out of the ground. Below are the flower parts, which precede the leaves, the spathes cut away to display the actual flowers. These attract flies and other insects, even honey bees, and these, by distributing the pollen, help to fertilize the blooms and produce the seeds. Photographs by the Author.**



through the melting snow. The months mentioned have reference to the plant in its northern habitat —for it ranges from Nova Scotia and Ontario to Florida, but in our middle states one may find its bloom by early January.

Skunk cabbage is most unfortunate in the popular name that has been bestowed upon it. And the name is really not fair since it actually is not so close to the pungent odor of the skunk. F. Schuyler Mathews comes near to a true description of the smell of the plant when he says: "The odor of the flower is imitative of decaying flesh, but it is not wholly bad, it reminds one of the smell of a mustard plaster and raw onions."

Skunk cabbage is usually found in low marshy ground bordering small streams and ponds. It puts forth its peculiar, attractive flowers first, these to be followed by the leaves. It is exceedingly prolific and in seeming anxiety to beat other plants, and herald the coming of spring, the spathe, which appears some time before the leaves arrive, will be found while winter is still with us. The characteristic habit of skunk cabbage in producing its flowers and fruit in advance of its leaves makes it somewhat of an oddity in Nature. As a matter of fact, many people are unaware of the relationship of the two parts, and a still greater number probably have no knowledge whatever of the peculiar form and appearance of the flowers and fruit. These are contained within the spathe, which is a fleshy horn-shaped growth, and is, of course, the most interesting part of the plant. The spathe is not without a certain attractiveness of its own, the outside color being a variegated mixture of purple, green and yellow, while the inner surface is usually a very deep red or purple. The thick and heavy-set spadix may be either very light or very dark in color and is covered with tiny flowers that produce an abundance of pollen.

One might think that the peculiar odor would repel rather than attract the insect life that seems so necessary for the propagation of the species. Nevertheless, Nature always takes care of its own and in this instance it will be found that the types of insects, mainly flies, that have been assigned to the job are those that would ordinarily be attracted to any decaying fleshy matter of whatever sort.

From the accompanying illustrations it will be seen that the flowers of the skunk cabbage are well hidden within the folds of the spathe, and that in order to observe and photograph its interior, this must be partly cut away. Shortly before the flowering part reaches maturity and begins to wither, the leaves of the plant make their appearance in the shape of a tightly-coiled spike or cluster, not unlike an endive in looks. From then on the leaves mature rapidly and become a top-heavy rank mass. When the leaves are just beginning to unfold they are rather attractive in color, especially when viewed against the sunlight.

The name and reputation of skunk cabbage would seem sufficient insurance against a poem being dedicated to it. Yet it has been done. Also, the form and structure of the spathe actually inspired an artist to produce an oversized replica in wood which was exhibited in the Whitney Museum in New York some years ago.

*Symplocarpus foetidus* is indeed a most interesting plant, and in many places spring certainly would not be complete without it.

## To the Skunk Cabbage

*By* RICHARD LE GALLIENNE

Will no one sing thee? Then will I,
The violet, though herself should die
Hath songs to keep her living still;
The laureates of the daffodil
Fill half the painted books of song;
And, all the perfumed summer long,
A thousand minstrels hath the rose.

Ah! what a pampered state is theirs,
Nursed by soft rains and April airs,
Spoiled darlings of the earth and sky;
Whilst thou in fetid swamps must lie,
Outcast from kindness, as from fame,
Banned by an evil-smelling name.

Yet, who, as thou, when all is drear,
The dark beginning of the year,
Lifts up so brave a torch on high,
In boggy woodlands black with mire,
Leaping with sudden urns of fire—
The only brightness in the world?
And not another leaf uncurled
In all the landscape far or near—
Of all the glories of the year
The mocked resplendent pioneer.

From *The Junkman and Other Poems,* by Richard Le Gallienne: copyright, 1920, by Doubleday, Doran and Company, Inc.

★

## Location

*By* LALIA MITCHELL THORNTON

Brambles, briars, sassafras,
Tangled bushes hard to match;
Stones and thistles, partridge grass,
These make up a berry patch.

# Moon Wisdom

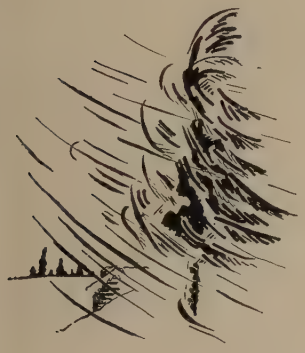
*By* PAUL CHURCHER

*Illustrated by Al Spader*

BACK through the pages of time, from the present to extreme antiquity, there is no chapter in scientific history so remarkable as the story of the moon. Unscientifically, the narrative is more amazing still. To all the peoples of all the nations of the world, this silver satellite of Earth has been both God and Goddess, calendar, clock, and mystic. Across Egyptian sands the shadows of the Pyramids lie black beneath the burnished light of Thoth; in central Europe, where the Alps look down upon the Danube's birth, lingers the fable of Horsel and Holda, whose boat, the crescent moon, scatters in its wake the slender, blue-flowered flax; in the Yangtze valley, the pattern-maker Ina spins white draperies from the clouds to adorn her celestial home; over the sky-piercing Andes, the cold eyes of Mama Quilla guard the ancient temples of the Incas.

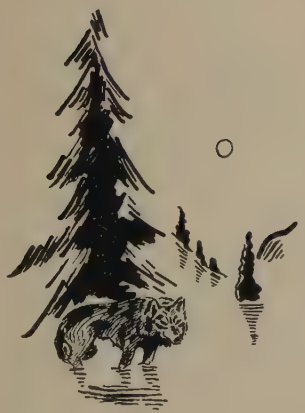
Even the impact of modern civilization has not discouraged moon-lore and superstition. In the United States today, men carefully plant one vegetable when the moon "pints up" and another when it "pints down," prepare for drought when it "lies on its back" and for floods when it "rests on one foot," get their hair cut in the new of the moon to cure dandruff, buy clothes in the second quarter to insure a perfect fit, vote for a candidate for President because he was born during the third quarter, cut corns in the old of the moon to stop their growth.

Not the least addition to moon-lore has come from that race which held the North American continent a century and a half ago. To the American Indian, the moon was a part of life. His language, his customs, his means of existence, may have varied from one section of the country to another, but his connotation of the moon was in many ways the same. Whether he were Seminole, Chippewa, or Algonquin, Iroquois, Chinook, Blackfoot, or Apache, the procession of the "Night Sun" around the year stirred like emotions beneath his copper brow. Anyone who would have even a passing acquaintance with Nature and its mythology can ill afford to miss the beauty and the reality offered by Indian names for each month's moon. In a dozen words is contained as clear and as concise a description of the seasons' cycle as will ever be conceived. Here are some based mainly on the lore of the moon among northeastern tribes.



January
SNOW MOON

The full fierce storms of winter lash the land; snow comes by driven gales, by steady, endless fall, by scattered, spectral flakes in early twilights; around the lonely cabin and over the buried lodge the white blanket piles deeper and deeper.



February
HUNGER MOON

Famine stalks the wilderness; the hidden cruelty of thaws is revealed in iron crusts and sudden, depthless cold; partridges struggle beneath the icy casing and are still, deer plunge on bleeding legs from their pursuers, wolves hunt in gaunt and skeletal silence; branches snap like rifles in the bitter night, and the sky becomes a hard, bright mirror reflecting a still, dead world.

March
WAKENING MOON

Torn, ragged clouds race down the dark horizon; the thin wood smoke of Long House Council Fires whips flat across the night; the raw wind boasts in gusty phrases above the muffled drumbeat of the first spring rain; in the channels of the Sabine and the Santee, in the beds of the Monongahela and the Beaver, of the Platte and Willamette, the onrush sates its greed with earth.

April
GRASS MOON

The last swift-melting sugar snow swirls wetly and wild geese clamor in the soggy dawn; the brown earth swells, the beech buds lose their sharpness, the grass roots stir and quicken; spring has come. Frogs chant from swamp and water course; birds seek their mates; life pulses.

May
PLANTING MOON

Arbutus keeps her yearly tryst with shadows, shadbush and dogwood climb the green-clad slopes, the homing redwing sways the reeds of marshes, the valleys spread their hands to Indian Corn.

September
HUNTING MOON

Days of storing and preparation, days of plenty, for the cheek-stretched chipmunk, for the questing grizzly, for the flint-tipped arrow poised on the hunter's bow.

June
CHICK MOON

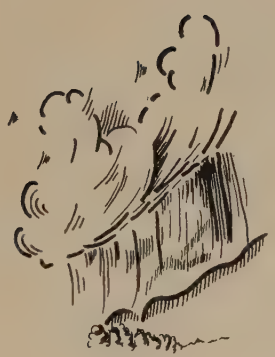
To all the lost and hidden coverts, from the quail's hollow in the field to the eagle's ledge upon the leaning crag, they come: bits of bright-eyed down, and blind, naked, craning nestlings.

October
LEAF-FALLING MOON

Maples spill in scarlet rivers into seas of pine; blueberries flaunt their garnet jewelry and the trembling aspen looses rustling arrows; blue jays lilt their rusty calls from sentinel oaks; feathered migrants draw slender lines across the moon.

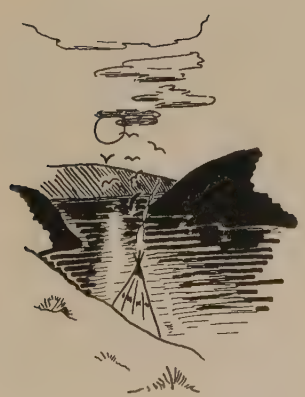
November
MAD MOON

Upon the land, the touch of the coming season lies like a moccasin print on a frosty morning; along the upper reaches of northeastern rivers, the great moose lifts his antlers; by tributaries born in western mountains, the beaver ends his labors; across the shallows of all the upland lakes, the first rim-ice steals outward.



July
THUNDER MOON

Month of berries, heavy along sun-ripened ridges; of storm clouds massing, swiftly dark against the high, free sky.

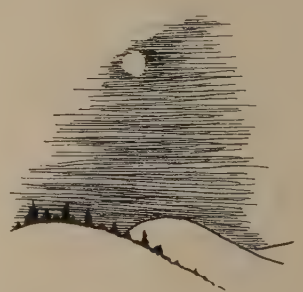


August
MOLTING MOON

From the gray sea boulders to the earthen lodges of the dancing Mandans, by day the red sun blazes, by night the red moon burns like a fire upon the hearth; the swallows lift in wind-filled curtains and all the summer guests make ready.

December
LONG NIGHT MOON

Black-boled against a silvered landscape, the forest waits; for a day or two the sun looks back from its southern journey, then from its Northern Fortress the cold flows out, over tundra and forest and prairie, over mountain and valley and high plateau, into the two stretched oceans.



**The machamach or wizard, on Yap, wields the magic wand made of the barbed spine of the much-feared sting ray. This may be used either to cure or to curse.**

*Taboos and superstitions make the Pacific islands of Micronesia a region—*

# Where Plants and Animals Rule

*Photographs by the Author*

*By* WILLARD PRICE

WE THINK of men as dominating animals and plants; but in some parts of the world animals and plants exercise considerable domination over man. This is true especially among primitive peoples. One of the most primitive spots left in this busy world is Micronesia. There animals and plants almost seem to be boss; man their slave.

The island world of Micronesia (small islands) in the western Pacific is now being invaded by our battle forces. Until recently it was a region little

**One of the greatest of the Yap stone coins, twelve feet in diameter. It is too valuable to belong to an individual and is the property of a community. The stone is supposed to contain an evil god.**

**Bagobos of Mindanao do some planting. He digs a hole and she drops in the seed. Every time a hole is dug the jug makes a clapper sound on the other end of the stick. This is to please the soil god.**

**A Korean witch doctor boils snakes for patients suffering from tuberculosis. This takes place within a stone's throw of a modern sanitorium that was run by American doctors. The natives, however, cling to the methods of the witch doctor and doubt modern methods.**

known to most Americans, even by name. Japan has owned most of the island groups since World War I, and has done her best to keep strangers out.

Nippon was preparing the archipelago for the war that is now on. As I write, news comes of our blows in the Marshalls. Formidable Truk has had thorough attention. Before the year is out it is possible that our men will have begun to get acquainted with the primitive brown men of Ponape, Palau, or even Yap, in the most westerly island group.

Because these islands have always been off the main roads of travel, and because they have been kept bottled up by the Japanese, native customs are less affected than in most other parts of the world.

My wife and I, giving the excuse that we wished to do ethnological research, secured Japanese permission to visit the islands in 1935.

How the life of the savage is influenced by his fauna and flora was illustrated graphically on the grim, rain-soaked island of Ponape. Where there is much rain there is much vegetation, and where there are many growing things there are many eating things. In rank, dank Ponape, animal life is vigorous.

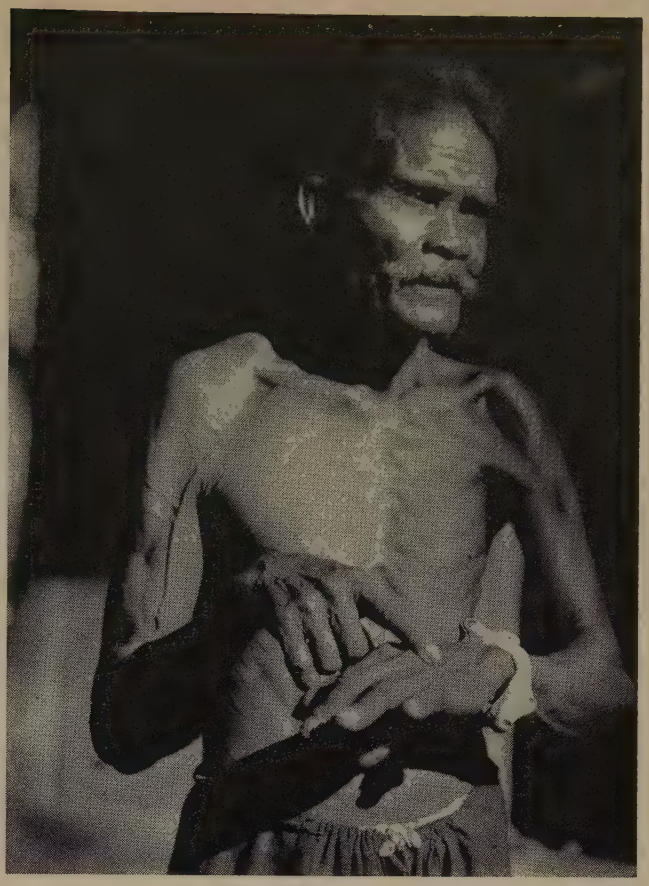
There are no dangerous four-footed animals—they have never been able to get there from the mainland. But it would perhaps be easier for an airman dropping into the interior of Ponape to defend himself against an occasional tiger than against the myriad of small barbed stinging things he would encounter.

The worse they are the more honor the native pays them, regarding them as semi-divine beings that must be propitiated with offerings and spoken of with the greatest respect.

There is the lowly centipede. It is common in the thatch and under the reed-grass flooring of the huts, and it can inflict a painful bite. The Ponapeans have a name for it that they think but do not speak. This is because of some forgotten religious taboo. Just as the Japanese must not call their Emperor by his name, Hirohito, so the Ponapean must never use the actual name of certain sacred animals. Evasive polite names are substituted. The centipede is supposed to be inhabited by a spirit that will be deeply offended and retaliate with a severe nip if you fail to use the proper ceremonial titles. And the peculiar thing about these titles is that it is thought more respectful to give the centipede a different name by day and by night. During daylight you must not fail to call it *Man-en-ran*, The Creature of the Day, and after dark it should be referred to as *Man-en-pong*, The Creature of the Night.

The native goes to a lot of trouble to mollify the animal gods. Time-consuming rites are necessary to keep peace with the vicious spirit that is supposed

**An offering of food and drink is placed by a Bagobo of Mindanao. This is located outside his home and is designed to see that the spirits of disease will have a hearty meal and will not be faced with the need of entering to prey upon his family.**

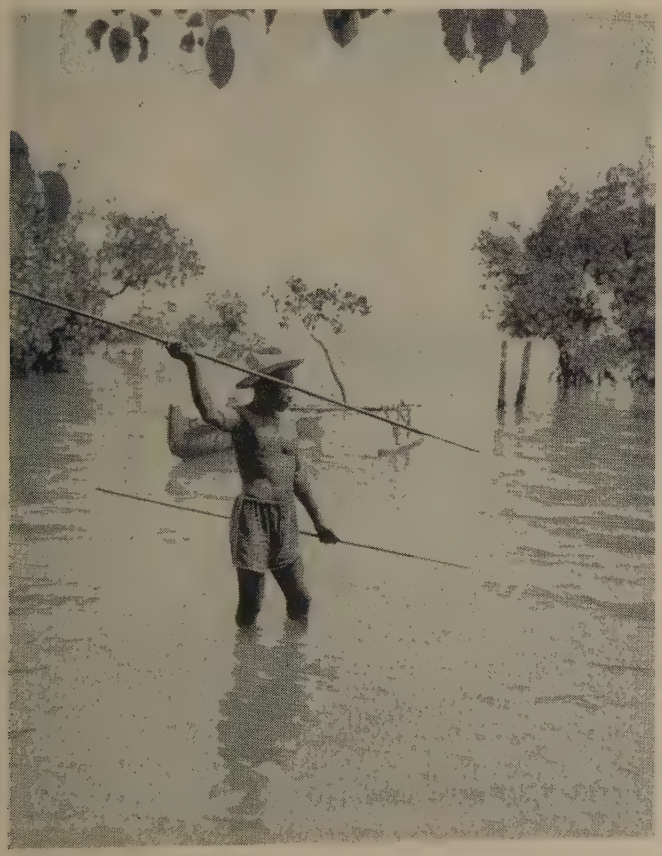


**This chief on Palau wears a bracelet of a porpoise's collar bone. His hand had to be painfully cut at the finger crotches so it would fold and allow the bone to slip on. The porpoise was believed once a man and now a sea god. The bone wearer will be a good diver.**

to reside in the *macho,* a particularly unpleasant green eel. It is quite as much at home in the air as in the water. It may be encountered by anyone wading through the salt-water marshes that belt the island of Ponape. When it does not find what it wants under the surface, it climbs a mangrove tree and waits to pounce upon any prey passing below. While we were in Ponape a man bitten by a *macho* was brought to the hospital. He died after two days. Long ago a cruel chief murdered his wife and children. His neighbors drove him into a swamp where he escaped by changing into an eel. This, according to the native legend, was the origin of the deadly *macho.* The spirit of a dead chief becomes a minor god. And since the chief was wicked, the god of the *macho* is wicked.

There is another savage eel to be found in fresh water. It sometimes attacks persons fording or bathing in the mountain streams. Here again, the real name, *it,* is taboo and the animal is addressed by the more respectful name, *Kamichik,* The Terrible One. On the Kiti uplands, 3000 feet above the sea, there is a lake filled with this writhing death. Christian natives of Mortlock identify this eel as the serpent of the Garden of Eden.

Almost universally anything snakelike has always been much dreaded, and sometimes devoutly worshipped. Serpents are also imagined, in any eastern countries, to have magical curative powers. We saw a farm boy in Japan bringing home two snakes to his mother as a cure for her pleurisy; and in Korea we saw snakes brewed for sufferers from tuberculosis.



The lizard is lord of many quaking hearts for he is the abode of the devil. The Ponape natives spend much effort trying to please the evil one in the savage, red-spotted black lizard known as *kieil.* And it would seem most unfortunate that the god of carpentry should choose to live in a mean tree-lizard, so that if a man wishes to build a house or a canoe he must first seek out this animal, no matter how hard to find, and pray for success. Otherwise he fears that the lizard-god will come in the night and destroy what he has done during the day.

There is an alligator-like skink that haunts burying grounds and feeds upon corpses—which distresses the natives, not because the bodies have been eaten, but because the spirits of the dead men will be angry and will return to avenge themselves upon their relatives.

A prickly green lizard called *man-tau-och,* meaning "animal-go-up-ivory-palm-tree," possesses an uncanny ability, it is said, of making any man who climbs this lofty tree become dizzy and fall. So a native will not go up a tree in which this animal is seen.

**A native of Palau spears a fish in a lagoon. Fishermen on many of the islands of Micronesia must observe many taboos and perform an intricate ritual to propitiate the gods of fishing. The first fish is never eaten but is cut up and thrown back into the water.**

Birds also control man. On the primitive island of Yap, in the Pelew group, the native will obey certain signs that he reads in the motions of the albatross. This bird is supposed to be a warning god. He will go miles around to avoid coming near the *orra*, a black nocturnal bird supposed to be the god of death and disease.

In the not distant Philippine island of Mindanao the *limokon* is a bird of prophecy. If you hear its cry on your right, you may go on, if on your left, you must turn back or your trip will lead to disaster. On a jungle journey of great importance I was much provoked when my guides stubbornly refused to proceed when they heard the voice of this winged oracle. There was nothing that could be done about it; the *limokon* had spoken. We turned back. How seriously this superstition interferes with the normal life of the forest folk can easily be imagined.

**Natives dig phosphate on the island of Angaur under the command of the Japanese. While they work they pray that this strange soil will not be angry with them.**

We perhaps think of superstitions as harmless notions—such as our reluctance to go under a ladder—fancies that really make little difference. They are more than that to the primitive. They are the ruling force in his life. They can easily spell death.

For example, in Sumatra a tiger was allowed to ravage a village at will, killing many people, because it was supposed to be the walking home of not one but many spirits that would wreak terrible vengeance if the tiger were molested. Finally it was necessary to kill it, but only with elaborate ceremonies during which the villagers humbly asked the tiger's pardon. The skin was preserved as a fetich.

The denizens of the sea extend their dominion over the human beings on the shore. The shark is a god and must be obeyed. The blue starfish, say the Ponape folk, will bring rain if it is plucked out of the lagoon—and that would be a pity since Ponape already gets more rain than it wants. If an expectant mother eats a certain spotted fish, the baby will be spotted.

The coral shelves of the Ponape lagoon are the home of The Favorite Wife of the Flame Tree, as the sea-slug is respectfully called. The variety found here is able to sting the flesh with its feelers and eject a poison that will cause blindness. This is one source of *bêche-de-mer*, a dainty much prized by the Chinese.

Yap fishermen stand in awe of the god of the sea. They do not dare go forth until they have made a proper offering to the god. They send out one fisherman who catches a single fish and brings it back to the All Men House, which projects into the lagoon. We stood on the platform of the All Men House one morning and watched the ceremony. The one fish was cut into eighteen pieces, for eighteen men were to go fishing. Then the eighteen men lined up at the edge of the platform and each threw his bit of fish far out into the lagoon. The idea is that if the first fish is eaten, the god will consider the fishermen greedy and will give them no more. But if the fish is returned to him, he will be generous.

The superstitions of fishing interfere decidedly with normal life. During the special fishing season of six to eight weeks, the fisherman must stay in the All Men House, rather than in his own hut, he dare not go home under any pretext, he must not so much as look at his wife; if he does it is believed that a flying fish will bore out his eyes. If she brings him food she must stand with her back to the clubhouse. He may then come out, stand with his back to her, and receive the gift. But if they so much as touch fingers, the sea-god will wrathfully upset his canoe.

Perhaps the most feared aquatic divinity is the sting ray. Its real name in Ponape is *pae*, but that must not be spoken. It is referred to reverentially as "Queen of the Sea Bottom." The queen, as becomes royalty, does not exert herself unduly. She lies passively on the bottom and waits for her dinner to be served. She is protected by a bared bayonet projecting upward from her tail—and if a wading native steps on this poisonous saw-toothed blade, the outcome may very easily be fatal.

The natives' superstitious dread of the sting ray is so great that the Yap wizard can capitalize on it and use the spine in his eerie business. He makes a wand of the vicious spine. By waving it in the air while chanting an incantation, he can either curse or cure. If you wish your neighbor to die you have but to pay the wizard's fee and he will wave the doomed man to death. If he does not obligingly die, the wizard will supplement his magic arts with something less magical and more effective—possibly the ministration of a little poison, or the placing of another sting ray, point up, in the victim's bed where he may roll upon it in his sleep.

On the other hand, if you are ill, and have the necessary fee, the *machamach*, as the wizard is called, will have a sting ray wand (Continued on page 220)

# A Universal Star Chart

*By* ISABEL M. LEWIS

*This is the twenty-ninth in Nature Magazine's series of educational inserts.*

**With this insert Dr. E. Laurence Palmer interrupts his series to allow Mrs. Lewis to present this timely astronomy feature. Mrs. Lewis, of the staff of the United States Naval Observatory, has been Astronomy Editor of *Nature Magazine* for twenty years.**

ABILITY to steer a course by the stars has become a matter of vital importance to many men who a few years ago did not know one star from another. Every plane flying on long missions has its navigator, as well as every ship that puts to sea. It is often the problem of the navigator of a plane to find some tiny atoll in the vast Pacific or, if driven off his course with a rapidly dwindling supply of fuel, to steer the shortest course to land. Success in the solution of this and other problems in navigation will depend upon the accuracy with which he fixes his course by the stars, or other celestial bodies, the sun, moon or planets.

Maps are essential to navigation, as are star charts and almanacs that give the positions of the heavenly bodies. There are certain bright stars known as navigational stars—fifty to sixty in number—which are used continually in fixing the position of a plane or ship. Although, in general, the positions of only a few stars are needed, the more that are available, and can be identified, the better. It is often important, when skies are partially overcast, to identify some lone bright star that shines forth between the clouds. It is also a decided advantage for a navigator to be familiar with the outlines of the principal constellations that are visible from different parts of the world.

If one travels great distances from his home the appearance of the heavens may change completely in a few hours. Even at the same place, in the course of the night, various constellations rise in the East, pass over the meridian, and set in the West. The stars come to the meridian about four minutes earlier each successive night. All these phenomena bring continual change in the appearance of the heavens, hour by hour and day by day.

The sky maps that are most in use in a popular way are prepared for some particular latitude, usually 40° North in the northern hemisphere, although they may be used for ten degrees or so north or south of this latitude with a fair degree of accuracy. They are generally prepared for some definite hour, usually eight or nine o'clock in the evening on the first of the month. As the stars come to the meridian four minutes earlier each night there will be a gradual westward shift of the constellations during the month at a rate that will bring them to the meridian one hour earlier every two weeks. Thus such a map is useful to a limited extent. If one remains within 500 or 600 miles of the latitude for which the chart was made, either to the north or south of it, he will gradually acquire an acquaintance with all the constellations that are visible in that latitude. He will also recognize the evening constellations when they appear at other hours of the night. If, however, this observer is going any great distance in a north or south direction across the equator he may as well leave these sky maps behind. They will be of little use to him. Many strange constellations will appear in the sky. Some of the old familiar groups will disappear completely and others will be seen in upside-down position.

Thus a star chart is needed that will give quickly the positions of all the brighter stars and principal constellations relative to the zenith and horizon of the observer, wherever he may be on the earth, at any hour of the day or night.

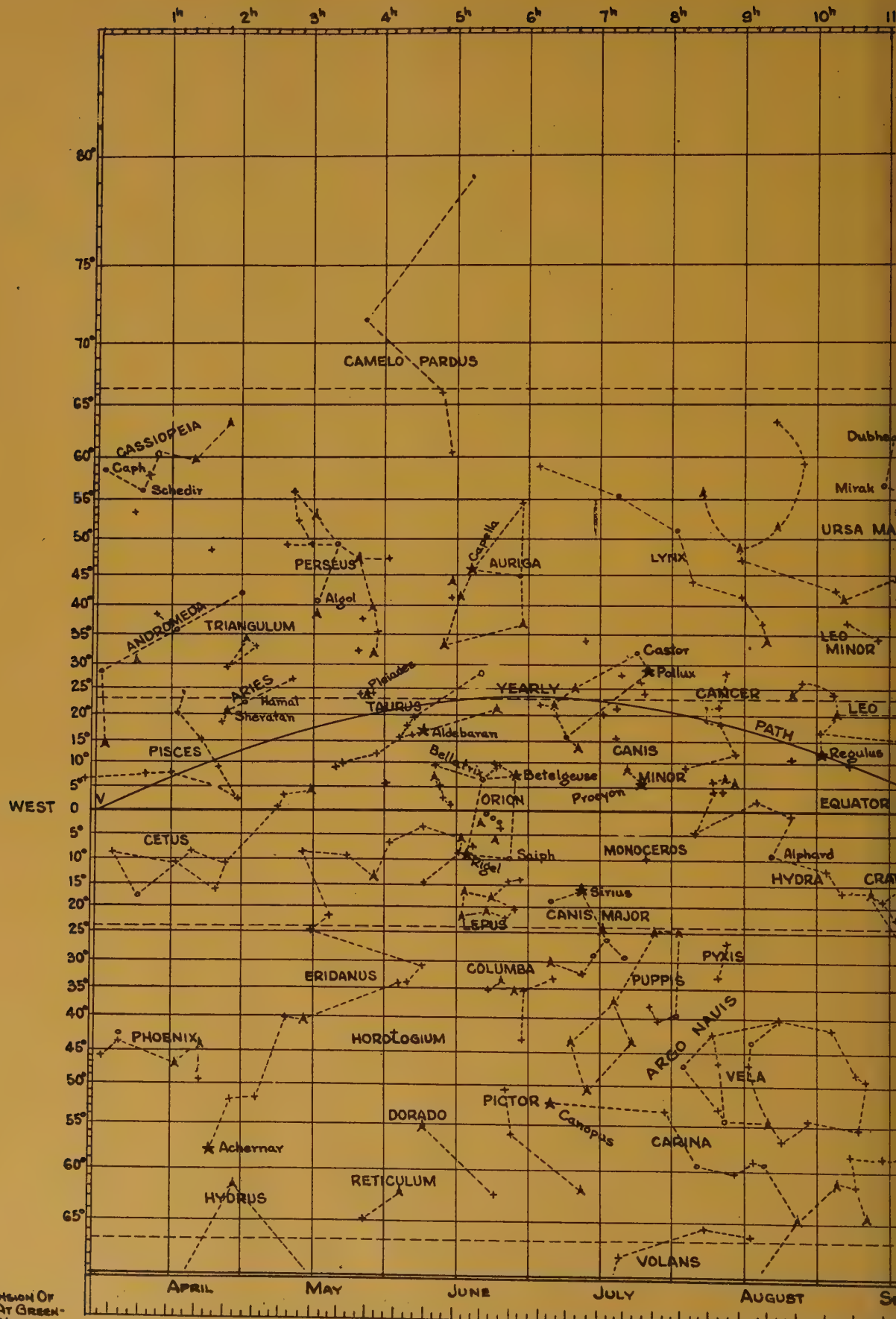
A Universal Star Chart reproduced in these pages fills this requirement for all latitudes on the earth between 70° South and 83° North. Much information may be obtained by the use of this chart by itself. When used in connection with the secondary chart, B, the position of the observer's horizon is shown, as well as his zenith, for any place on the earth.

This chart has been constructed on the Mercator projection, which has proved to be more useful in navigation than any other type of projection. It shows, on one map, all the constellations in the heavens, with the exception of a few in the extreme north and south polar regions. It is impossible in any projection of a sphere upon a flat surface to avoid distortion in some part of the map. In a mercator map the distortion is where it is least troublesome for our purpose—in polar regions. Mercator maps are used in almost all atlases of the world when the purpose is to show all of the earth's surface in one map.

There is a close connection between a Mercator map of the heavens and one of the earth on the same scale. This connection can be made use of in solving many problems in navigation and in identifying the observer's position on the earth by means of the stars above.

The position of a star on the map of the heavens is found by means of its right ascension and its declination. This is found in much the same way that the position of a point on the earth is found by its longitude and latitude. Compare, for example, a Mercator map of the earth, which may be found in any atlas of the world, with the Mercator map of the sky, which we have here in our Universal Star Chart. In both maps there is an equator, represented by a straight line near the center of the map and running in an east-west direction. At right angles to the equator are the meridians on the earth, and what are known as the "hour circles" on the sky map. These show, respectively, longitude on the earth and right ascension on the sky map. Longitude on the earth is reckoned usually through 180 degrees, or 12 hours, east and west, from a zero meridian. The meridian of Greenwich (Con. on page 200)

# Universal Star Chart

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# How to Use the Charts

The scale at the bottom of the sky chart (A) gives the position of the mean sun at Greenwich Mean Noon at two-day intervals throughout the year. We are interested in the position of the mean sun, rather than that of the true sun, because time is kept by the uniform motion of the mean sun. The motion of the true sun is so irregular that clocks cannot be adjusted to keep true solar time. The dates given on the scale are for a leap year, as 1944. In a common year read the dates in January and February one day earlier. For example February 29 in 1944 is read February 28 in 1945. Later dates in the year remain the same. The scale is applicable, then, to any year, and the star positions will not change appreciably for a number of years. The position of a planet can be located on the chart at any time if its right ascension and declination are known.

The position of the mean sun at mean noon at Greenwich can be taken as approximately its position at mean noon at *any place* on the earth, because its eastward motion in one day (3 minutes, 56 seconds) is so small that it is inappreciable on the scale of the chart.

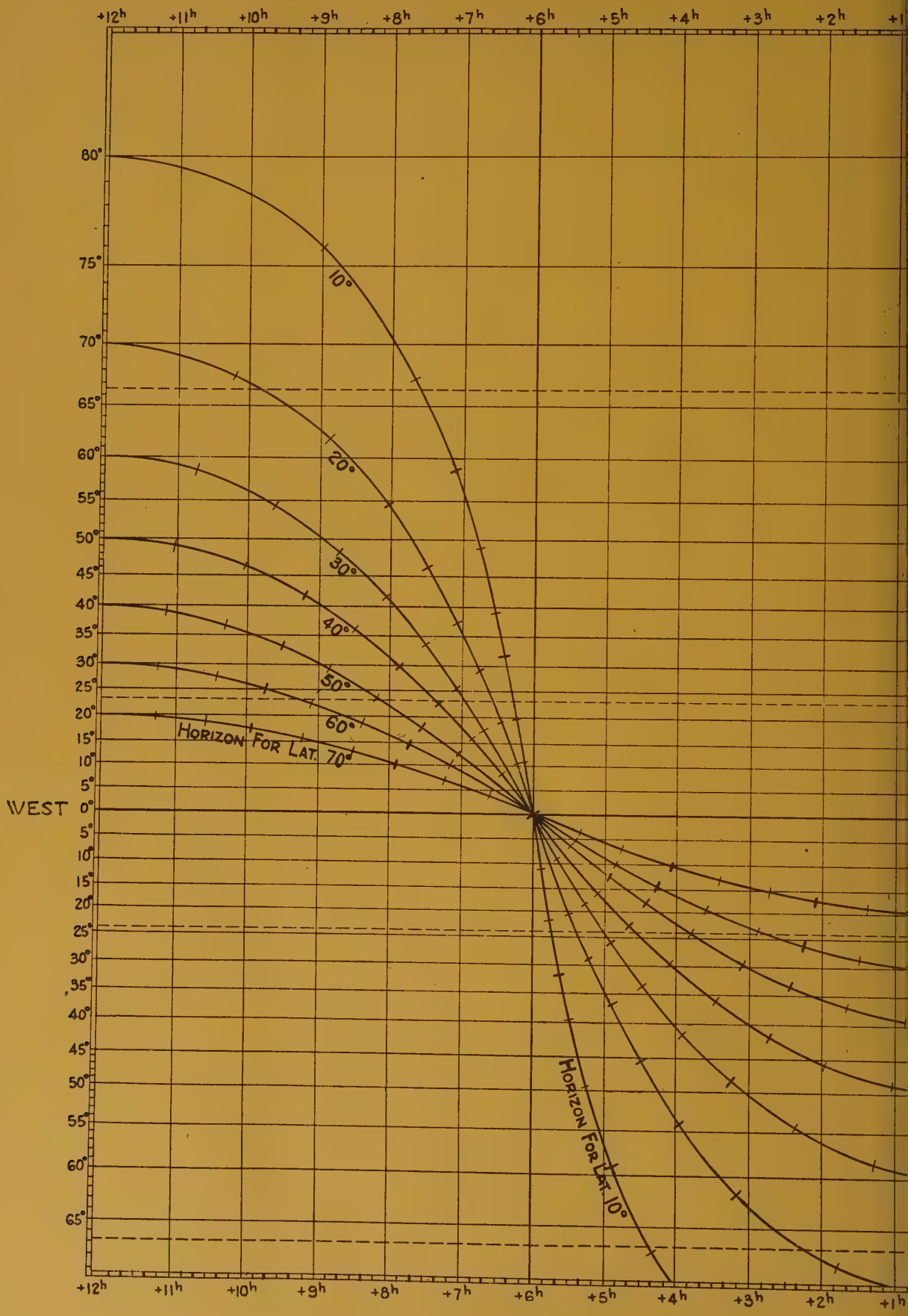
First find on the scale the date desired and read off on the chart directly above it, the corresponding right ascension of the mean sun at noon for that day. By means of the divisions into ten-minute intervals of each hour of right ascension at the top of the chart it should be possible to obtain this within a minute or so. This is the right ascension of stars on the meridian at noon of that day. The right ascension on the meridian at any other hour of the day is now to be found. If the time is *after* noon, add the number of hours after noon to the right ascension at noon. If the result exceeds 24 hours, subtract 24 from this amount and the remainder is the right ascension of stars on the meridian at the required time. If the time is before noon subtract the number of hours before noon from the right ascension at noon. However, if the right ascension at noon is less than the number of hours to be subtracted, first add 24 hours, then subtract. The result is the right ascension of stars on the meridian at this time *before* noon. If, for example, the time is July 4, 3 A.M., the right ascension at noon is found from the scale to be about 6 hours, 50 minutes; subtract 9, which is the number of hours 3 A.M. is before noon, from 6 hours, 50 minutes, plus 24 hours. The result is 21 hours, 50 minutes. This is the right ascension of all objects on the meridian of the place at that time. So we have now located the stars on our meridian at the required time.

The point overhead, or in the zenith, must be on the meridian. It is at a distance north or south of the equator equal to the latitude of the place. Measure this off from the equator on the meridian by means of the scale of declinations at the east or west border of the chart, northward or southward from the equator according to whether the place is north or south of the equator.

What we now have is the position of the observer's meridian on the chart and the point overhead for the date and hour required. The time is *local mean time.* Before using the chart it is necessary to change whatever time is being used to the corresponding local mean time. If, for example, the time is War Time for the observer's standard meridian, such as Eastern War Time for Washington, D. C., the corresponding local mean time is found by subtracting one hour (the War Time correction), and, in addition, if the place of location is not on the Standard Meridian, an additional number of minutes must be either subtracted or added according to whether the place is west or east of the Standard Meridian. For Washington this correction is minus 8 minutes, as Washington is 8 minutes in time west of its Standard Meridian (the 75th meridian). The general rule is to find how many degrees in longitude the place is east or west of its Standard Meridian and allow 4 minutes of time for every degree. Subtract, if the place is west, and add, if the place is east of its Standard Meridian. The local mean time at Washington corresponding to 8:30 P.M., Eastern War Time, would be 7:22 P.M.

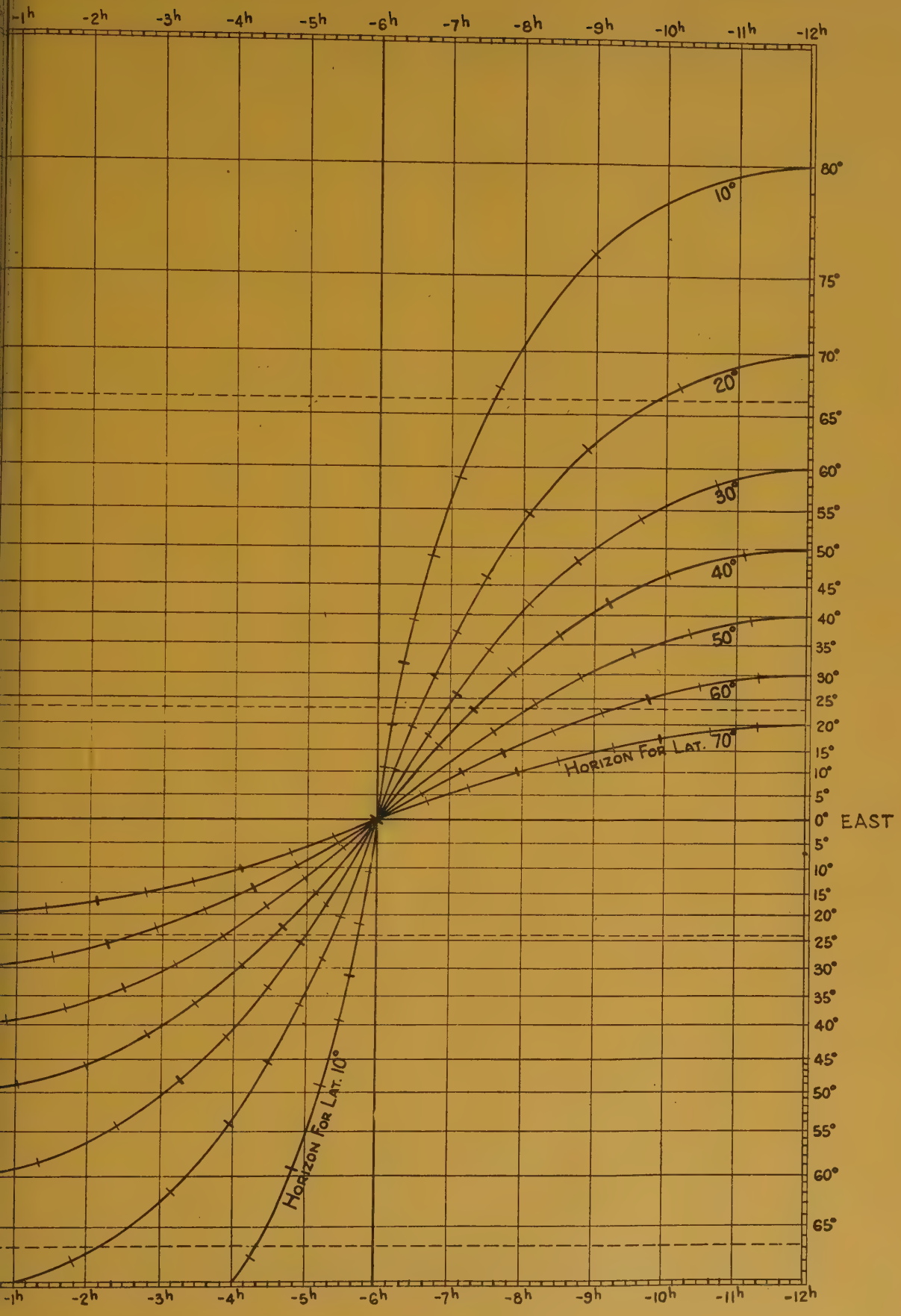
When the stars on the meridian have been located for the required

# Horizon Curves and Position in the Horizon




**For use south of the Equator, invert chart.**
**The horizon curves are now for south latitudes, corr**

# Chart B




East is at right, West at left, North at the top.
respectively, to the same latitudes north of the Equator.

time, and the point overhead determined for the given latitude, the next step is to locate the horizon for that latitude. This is done by means of the horizon curves of Chart B. It would be a great advantage to have this chart made of transparent material, but as this is not possible here, the chart is to be cut along the latitude curve corresponding to the latitude of the place where it is to be used or the one nearest to it, preserving the scales at bottom and sides. If the place is on the equator, the horizon is limited by the two lines at +6h. and —6h., at right angles to the equator, instead of a curve. All stars between these lines north and south to the poles are above the horizon when the zero hour line is placed on the right ascension on the meridian at the given time. This applies only to latitude zero, or the equator.

In cutting along the curve keep all of the part *below* the curve, and along the east and west margins, to the points where they meet the curve for that latitude.

If the latitude is North the part of the sky visible lies north of the curve. If the latitude is South the part of the sky visible lies south of the latitude curve *after it has been placed in an inverted position.* The same curve after it has been cut out can be used in direct position for the north latitude and inverted for the same latitude South.

To use the curve after it has been cut out, put the line marked 0h. on the right ascension on the sky chart that was found to be on the meridian at the required time. Always keep the two equators in line; that is, the equator of the horizon curve cutout is to be on the equator of the sky chart.

The hours marked from 1h. to 12h. east and west of the 0h. (+ west and — east), are called the "hour angles" of objects at these distances east and west of the meridian. If an object is 1h. east of the meridian it will cross the meridian in one hour, and if it is 12h. east it will cross the meridian in 12 hours. Objects in the —12h. position thus will be on the meridian 12 hours later. If the object is 1h. west of the meridian it crossed the meridian one hour earlier, and if it is in the +12h. position it crossed the meridian 12 hours earlier.

The positions of points on the horizon, counted from the north point through 180 degrees to the south point on the horizon, are indicated at ten-degree intervals. The two points on the equator at 6h. and —6h., through which all curves pass, are points due east and due west on the horizon. The directions North, East, South and West are indicated in the margins of both charts.

If the latitude is south of the equator it must be kept in mind that the chart must be used in inverted position. The stars visible are then south of the curve, and the point in the zenith is the one marked on the curve but *south* of the equator. The position of the stars relative to the zenith are indicated by the points of the compass given in the margins of the charts and the division lines on the curve, as explained.

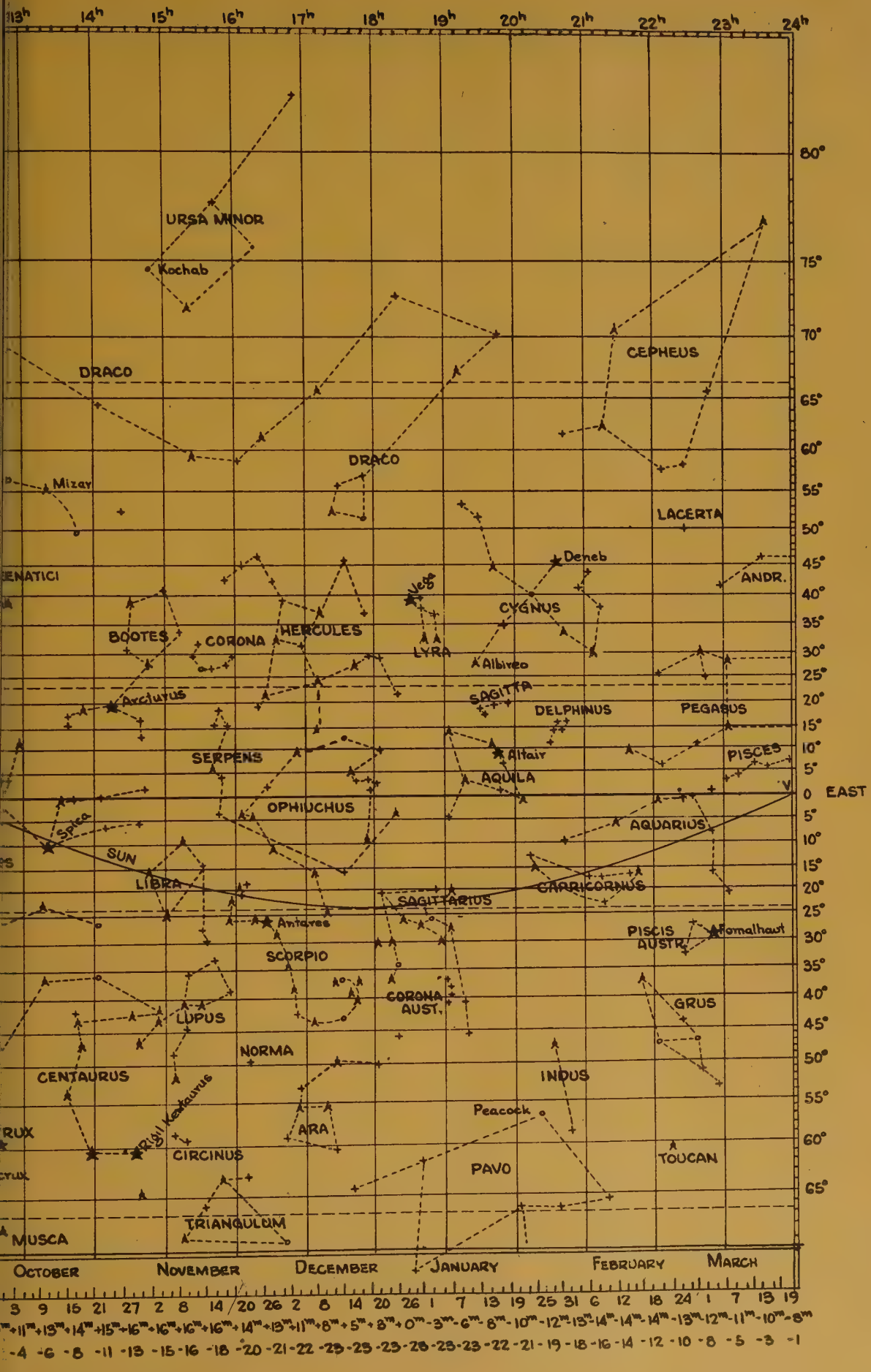
For every latitude except at the equator there is a region in which the stars never set. This is the part of the chart in the direction of the pole *above a line* connecting the points where the curve meets the east and west margins in the northern hemisphere, and *below the corresponding line* in the southern hemisphere. In both cases it is in the polar regions.

When the horizon curve is in position on the sky chart it will be seen that usually one half of the chart will extend more or less beyond the border. In that case the missing part is at the opposite border, as the circuit of the heavens repeats continuously. The difficulty could be overcome by joining two duplicates of chart A together, the left margin of one to the right margin of the other. The two would be folded together when not in use.

The position of the *true* sun at noon can be located, by means of its declination for the date, given at the bottom of the sky chart. This gives its position on its yearly path for that day.

The equation of time given at the bottom of the chart for the same date shows the position of the true sun relative to the meridian at mean noon. If the sign is plus, the true sun is west of the meridian at mean noon and by the number of minutes indicated. If the sign of the equation of time is negative, the true sun is east of the meridian at mean noon by the amount indicated. See page 200 for an example of the practical use of the charts.

# Chart A




1—人; 4th—+; 5th—·

(Continued from page 193) is universally adopted as the zero meridian for the earth, and Greenwich Civil Time, or Greenwich Mean Time, is time referred to this meridian.

On the sky chart we have, instead of longitude, right ascension. This is reckoned from a zero hour circle *eastward* through 360 degrees, or 24 hours around the heavens and back to the same point. The zero hour circle passes through the vernal equinox, V, one of the two points where the yearly path of the sun crosses the equator. To find the right ascension of an object on the map we note how far its hour circle lies east of the zero hour circle, which is at the left hand edge of the chart. The distance between each successive pair of parallel lines is one hour of right ascension (or 15 degrees). The right ascension of Algol, in Perseus, is a little over 3 hours, and the right ascension of Antares in Scorpio is about 16 hours, 30 minutes. Each hour of right ascension is divided into six ten-minute intervals, and it should be possible to estimate the right ascension of any object on the chart within a minute.

In order to locate an object on the earth one must know, in addition to its longitude, its distance north or south of the equator, or latitude. On the sky chart this distance north or south of the equator is called declination. On a mercator map of the earth there is a series of lines parallel to the equator that are the projections of the parallels of latitude on the globe. Corresponding to them on the sky chart are the projections of the "declination circles" parallel to the celestial equator. Latitude on the earth is reckoned north and south from the equator from zero to 90 degrees; so, also, is declination on the sky chart. The degrees of declination are shown on the right and left borders of the chart from the equator to 70 degrees declination south of the equator, and to 83 degrees north of the equator.

The right ascension of Algol was found to be 3 hours. Its declination, by reference to the scale on the east and west edges of the chart, is found to be a little more than 40 degrees north; the declination of Antares is about 26 degrees south. So the right ascension and declination of any object may be found. If the right ascension and declination of any object not on the chart is known, such as a planet, the sun, or the moon, its position can be plotted on the chart and so its position among the stars found for any time.

There is a very important connection between the latitude of a place and the declination of a star. Use is made of this fact in finding the latitude of a place on the earth by means of the positions of the stars. The declination of a star is the same as the latitude of the place beneath it on the earth. For example, if the declination of a star is 20° north it will pass directly overhead at places on the parallel of 20° north latitude. To illustrate: Deneb, in Cygnus, is in about 45 degrees north declination. It will, therefore, pass directly overhead at some time during the day or night at places in 45 degrees north latitude. Spica, in Virgo, is in 10 degrees south declination. So it will pass overhead in latitude 10 degrees south. Stars that pass overhead, then, are the ones that have declinations equal to our latitude, whatever it is. One may see from a glance at the sky chart what stars are going to pass overhead in the latitude we are interested in, also what stars will pass north or south of our zenith, and by how many degrees.

One must know, in addition, the position of the meridian among the stars, or, in other words, its right ascension at the desired time, in order to know what stars are visible.

Instructions on the back of Chart B show how the two charts are to be used to fix the position of the observer's horizon and zenith for any hour on any day of the year.

As an example of the use of the charts let us find what constellations are visible at Honolulu, on July 4, 1944, at 10:00 P.M., Hawaiian War Time.

Honolulu is in longitude 157.8° west of Greenwich, latitude 21.3° north. Its Standard Meridian is 162.5° west of Greenwich. It is, therefore, 4.7° or 19 minutes of time east of its Standard Meridian. So the local mean time at Honolulu corresponding to 10:00 P.M. Hawaiian War Time is 10 hours, minus one hour, plus 19 minutes, or 9 hours 19 minutes after noon.

Find on the scale at the bottom of the sky chart the point corresponding to July 4 (one-half division west of the position indicated for July 5). Read the corresponding right ascension on the chart above by means of the right ascension scale at the top of the chart. It is approximately 6 hours, 50 minutes. Add this to the 9 hours, 19 minutes after noon and the result is 16 hours, 9 minutes. This is the right ascension on the meridian of Honolulu at the required time. Locate it on the chart and place the 0 hours of Chart B in this position on the sky chart with the equators of the two charts in line. Use the horizon curve marked 20° because it is nearest to the latitude of Honolulu. The point in the zenith is on the meridian 21.3° north of the equator. Locate this point and note the positions of the constellations relative to it and to the horizon curve.

Hercules is directly northeast of the meridian. Corona directly northwest; Ursa Major is in the northwest; Arcturus is a few degrees west of the zenith; Altair is in the east, Vega and Deneb in the northeast. Antares is a little east of the meridian in the south; Regulus is nearly on the western horizon. Spica is in the southwest; Rigil Kentaurus and Beta Centauri are near the southwestern horizon; Serpens and Ophiuchus are south of the zenith; Ara, Sagittarius, and Capricornus in the southeast.

Note where the east border of the sky chart lies with respect to Chart B and then move Chart B to the opposite border in the corresponding position. Note any constellations above the 20° curve in this region. Cassiopeia is mostly below the northeastern horizon. No other constellations are visible in that part of the heavens.

The time when a star crosses the meridian is easily obtained. Find its right ascension from the star chart; also that of the mean sun at noon on the same day, from the scale at the bottom of the chart. The difference of the two right ascensions gives, within a minute or two, the number of hours and minutes before or after noon that the star will cross the meridian—*before* noon if the star is west of the sun and *after* noon if the star is east of the sun.

These charts fit exactly the Rand McNally and Company Popular Map of the World. It is not possible to take up here many additional uses to which this combination of charts may be put. It is hoped, however, that these two charts may in time be available in transparent material for use with this map of the world for star identification and other purposes.

# As We See It

★

## Billboards and War Advertising

Rural billboards are blots upon the landscape of America. We have long maintained that they are a form of abuse of the rights and privileges of the public, whose money built our highways. We have fought—and shall continue to fight—for control and virtual elimination of rural billboards through legislation and zoning regulations.

The billboard industry has seen the handwriting on the wall. Its leaders know that they are facing an aroused public opinion, and so they are doing everything they can to mitigate and appease the flood tide that is running against them. This war offers them a great opportunity. Under the guise of helping to win the war, those structures that formerly advertised gasoline, automobiles, washing machines, and varied consumer goods now no longer available, are now blazoned with such messages as "Buy Bonds" and "Stamp Out Forest Fires." Either directly through contribution of free space, or by advertising sponsored and paid for by private industry, the United States Government is using billboard space—just as it is using free advertising space in newspapers and magazines, and time on the air.

We know that after the last war the billboard industry made wide use of letters of appreciation from government officials for their "patriotic services" to prove that outdoor advertising, anywhere and everywhere, has the blessing of Uncle Sam. It has tried similarly to use every donation of billboard space for any public cause to embarass all subsequent opposition. Indeed, the billboard industry seldom does a favor or patriotic act without expecting a return in terms of protection from regulation.

We are not fooled. We make these charges on the basis of a quarter century of practical and intimate experience with the industry's methods, and in the battle in defense of our rural roadsides. But we are willing to make a temporary sacrifice of anything that may help us win this war more quickly, and thereby save lives. We believe that even the most ardent conservationists will agree to this attitude and certainly all who have men at the front will endorse it.

However, there are some who feel that the U. S. Forest Service, which rightly excludes outdoor advertising from the National Forests, should not use commercial billboards to urge fire prevention, even in wartime, lest it compromise its position afterwards. One proposal is that the Forest Service, and other branches of the Government, put up their own artistic and dignified posters within the highway rights-of-way after the fashion of official road signs. This, it is claimed, would serve as proof of official disapproval of rural billboards in general. Serious objections to any increase in signs on the right-of-way at once come to mind. Moreover, such an idea ignores shortage of man-power, lack of materials and the difficulties and delays inherent in such a project. Winning the war is an *immediate* problem.

A returned soldier recently gave us an excellent story that illustrates our view of this proposal. He told us of a party behind the lines in North Africa attended by some visiting movie-star entertainers. The boys wanted to dance, but try as they might, no dance music was forthcoming on the radio at that hour from any Allied station. They finally got "Axis Sally" from Berlin, whose program supplied the needed "groovy" music, and got on with their "morale building" party, laughing off the interlarded German propaganda when it came. They did not wait for the OWI to supply "swing" from a purer source, and we think they were entirely justified.

We do not feel that it is necessary to wait for billboards from a purer source in order to get on with home front morale building, either; but like these boys, we know propaganda and the potential evil of the source from which it comes. We trust that the American people, after this war, will equally laugh off claims that the billboard industry will surely attempt to make. Use of their boards to help sell bonds or prevent forest fires is like using Berlin dance music to help improve morale. It demonstrates no more endorsement of the necessity of rural billboards in peace time than temporarily listening to "Sally" proves the world's need for Adolf Schickelgruber.

It is to be hoped that those government officials who are now quite justifiably taking advantage of every means of doing the job assigned them, will keep this in mind when they write letters of thanks for the use of rural billboards. We might remind the billboard industry that, after due trial, "Axis Sally" is due to be lined up and shot, despite the fact that she may have made some incidental and inadvertent contribution to the morale of American soldiers.

*Knowledge of soil, its composition and its needs, is the gardener's key to—*

# What Makes Your Garden Grow?

*By* ANDREW S. WING

IT IS the soil in your garden that grows your plants. Trite as this idea may seem, it is a fact often overlooked by novice gardeners. Even oldtimers are often guilty of bad practices in handling their garden plots, flower borders and lawns.

Fortunately there is a current revival of interest in the soil and its problems. Meetings held in large cities by the Friends of the Land, featuring the crusading Louis Bromfield, have drawn capacity crowds. Lately, the challenging book, *Plowman's Folly*, by Edward H. Faulkner, has caused such a dither in farming circles that debates are being held in metropolitan town halls and clubs. It is a wholesome sign, this revival of interest in the soil. Started even before the war made necessary an all-out program of production, and with millions of new gardeners in touch with the earth for perhaps the first time, straight talking and thinking is necessary to avoid the pitfalls of current fads and fancies of soil management.

What the average home gardener wants to know is *not* how to stop erosion, or the most economical way of growing winter wheat or maintaining pasture lands; he is concerned with managing his small plot so as to get maximum production with a minimum of expenditure of time, effort and materials. He wants a good crop of tomatoes and other vegetables, a thrifty lawn free from weeds, and perhaps an apple tree or two and some small fruits. The principles of handling the soil on a homesite are the same as on a farm, but the practices may be quite different even from those on a commercial truck farm.

However, since there is no denying that it pays to know some of the "why" as well as the "how" of soil management, suppose we brush up first on just what soil is. My dictionary defines soil as "that portion of the earth's surface in which plants grow, usually consisting of disintegrated rock and decayed organic matter." If we bear in mind that the rock particles are usually finely ground, and that organic matter may be either of plant or animal origin, that definition will do as well as any.

Obviously, the nature of your soil depends to a great extent on its origin, but its productiveness will also depend on how it has been treated by Nature and by man. If near the shore, your soil is likely to be sandy; if of glacial origin, it may be clayey, loamy, or gravelly, depending on the fineness of the particles and the amount of organic matter present. If your garden was once the bottom of a lake or swamp, or a prairie, it may be almost black with

**Dad gets some spiritual assistance, at least, as he bends to his work and prepares the Victory Garden plot for its 1944 production task. A pail of lime awaits in the wheelbarrow because it has been determined that the soil is on the acid side and so needs such treatment. U. S. Department of Agriculture photograph.**

**Making plans for this month's garden article, we asked our secretary, who is an active Victory Gardener, what she would like to read about. "Soil", she said, "and how to handle it." So we passed the assignment on to Andy Wing, our Garden Editor and Secretary-Manager of the National Victory Garden Institute. "Fine," he said, "and it's a hot subject these days." So here is the latest on soil in the garden and how to treat it. Good luck, and may your Victory Garden produce a bumper crop.**

organic matter, or even pure peat. There are a great many variations in soils, with appropriate names, depending mostly on the types of rock from which they were formed.

If your soil was formed from limestone rock, it will be alkaline or "sweet," while granitic soils are usually acid or "sour." If you are fortunate enough to have a soil of volcanic dust it may be very fertile, even though lacking organic matter.

Then, of course, you may have a place where a careless builder has dumped fill or subsoil, mixed with plaster, brickbats and other rubbish. Such soils are always a problem, although not often entirely hopeless. Victory Gardens were grown last summer in spots that most soil experts would have said were impossible, and some of them were not bad. Which reminds me of a watermelon plant that once volunteered in a dump that was mostly coal ashes. Much to my surprise this melon plant actually produced a fruit that ripened and was eaten. However, to grow watermelons, seek a fertile soil, not a dump.

How to tell whether a soil is fertile or not is not always easy, unless an actual soil analysis is made. If you are using a new lot, usually you can get a fairly good idea from the character of the vegetation. A dark soil that is growing a good stand of weeds or grass is likely to make a good garden spot, provided it is well-drained, free from invading tree roots, and has at least six hours of sunlight a day. A loamy or a sandy soil is usually preferable to a heavy clay soil. Clay soils may be fertile but are difficult to work, and frequently are poorly drained and therefore hard to handle in early spring. A swamp or muck soil may make a perfect graden after it has been drained, sweetened with lime and a balanced supply of the deficient plant foods have been added.

Usually we must take the soil that we have and make the most of it. However, it is wise to make sure whether the soil is acid, or seriously lacking in one or more of the vital elements of fertility. To make a test for pH, or acidity, is fairly simple. Take a soil slice six inches deep with a knife or spade, work it up into a moist ball and insert a blue litmus paper. If it turns red, it is acid enough to need lime; if it stays blue, it is alkaline and liming is not necessary. This is a crude test, but usually accurate enough for practical purposes. There are more sensitive papers on the market that register different degrees of acidity or alkalinity. Remember that most plants like a soil that is slightly on the acid side, and the broad-leaved evergreens, such as mountain laurel and rhododendron, must have an acid soil to exist. The legumes are the lime lovers—beans, peas, clover, and such, although even some of these are fairly tolerant of acidity.

Having settled the lime question, how about the

**Know your soil is a good axiom for the Victory Gardener, and such knowledge will prevent many failures. Where they are handy, agricultural agents and experiment stations will test your soil, but many gardeners like to do their own testing with handy amateur kits that are available, and are simple for the gardener to use. Photograph from Sudbury.**

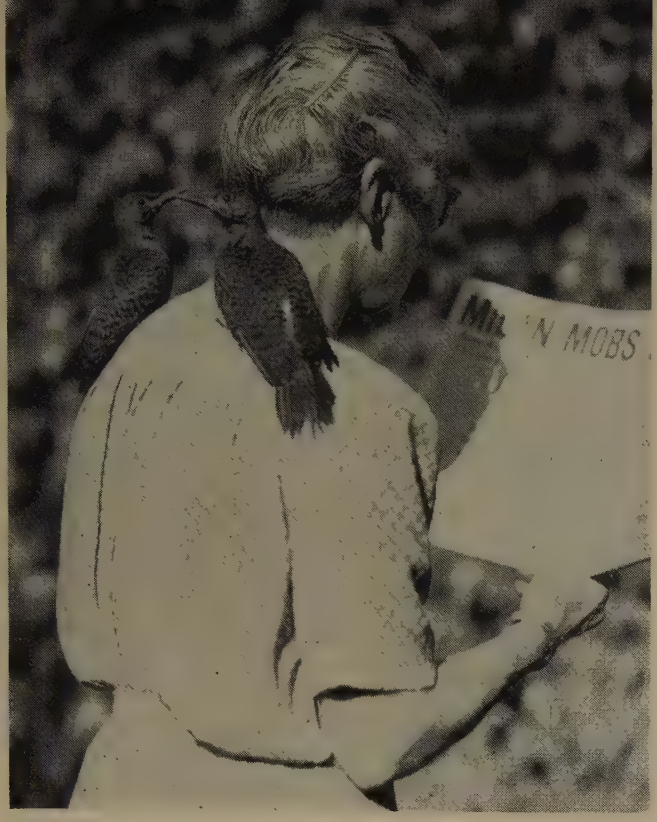
**Proper preparation of the soil and knowledge of its needs spells results. You can have a scraggy and discouraged growth of vegetables or flowers, or a luxuriant stand of plants, as with these medal-winning petunias known as Cheerful. Burpee photograph.**

other chemical elements that have to do with productiveness? The ordinary, so-called complete, or Victory Garden fertilizer is designed to supply enough nitrogen, phosphorus and potassium for the needs of the average garden or lawn. If you buy a 50-100 pound bag of 5-10-5 fertilizer, that should be enough for the average garden of from 1500 to 5000 square feet. But do not dump it on all at once. That is all right with lime, which may be applied before the ground is plowed or spaded in the spring, or in fall or winter. The modern way of applying chemical fertilizer, which is quick-acting, readily available and therefore subject to chemical changes or leaching, is to make several applications—one at the time of seeding, another a month or so later, and still another in mid-season, or when a later crop is planted. Instead of broadcasting this plant food—a wasteful practice—apply in the bottom of the seed row, covering with soil before the seed is planted. Perhaps better still, sprinkle a fine, even row of fertilizer in a drill a few inches away from the seed row. In the case of tomatoes or other large plants, a circle may be made around the plants when they are set out. Even better is the use of what is called a "starter solution" at the time the young plants are transplanted. This is a weak solution of essential chemicals needed by plants, similar to those used in hydroponics or chemical gardening. A solution of ordinary chemical fertilizer may be used, however, but it should not be strong—5 pounds to 100 gallons of water would be strong enough. There is a definite trend toward liquid fertilizers today, because of their greater availability, especially in dry weather. But in the ordinary home garden, the old-fashioned method is still good enough.

Now we come to one of the controversial subjects—organic versus chemical fertilizers. The opinions of impartial experts, and my own experience, point to the conclusion that both are all right to use in their place. Organic matter is desirable in a garden—in fact, essential—but it will be an expensive matter to supply plants with all the food needed through the use of organic fertilizers alone *unless* an abundant and cheap supply of barnyard manure is available. Even then, if there is a serious shortage of phosphorus or potassium in your soil, you will not find it practical to supply this lack with manure alone, or with compost, or other readily obtainable organic matter. A commercially processed sewage sludge comes as close to this ideal organic fertilizer as anything I have found, but, since its analysis is relatively low, I supplement it with a regular Victory Garden fertilizer.

In general, then, it is best to obtain as much well-rotted manure as you can afford; then supplement it with a good grade of chemical fertilizer. If you cannot buy manure at all, keep up your organic matter supply by growing and spading under a cover crop, such as winter rye; by composting your leaves and other waste vegetable crops; or by buying a few bags of leaf mold, peat, peat moss or good top soil. Dried sheep or cow manure, although fairly expensive for the amount of actual chemical plant food provided, does supply the needed organic matter. So does dried blood, bone meal and cotton-seed meal, all excellent fertilizers although slow-acting.

Basic to supplying the garden soil need is a knowledge of the soil. This can be obtained by a chemical analysis. This you can make yourself with one of the good soil-testing kits that are available for amateurs. It is wisest not to buy the (Continued on page 216)



The flickers would swoop down to take a ride on the friendly shoulder or back. Here there seems to be a lively discussion of war news.

Full up and not able to eat another berry. The little runt female was the last one to break the family ties and start out for herself.

# The Birds Remembered

*By* IRENE FINLEY

*Photographs by William L. Finley*

WE HAVE always been more or less in the convalescent-home business for bird and animal waifs left on our doorstep. Each one has been given a name and invited to stay as long as he could get along peaceably with the rest. But there were real complications one day last summer when we found ourselves the stepparents of six baby birds, four flickers, a cedar waxwing, and a black-headed grosbeak, all but one still in swaddling clothes.

The mournful, clammy grosbeak had a few feathers here and there, and nothing but sprouts and fuzz on his rear—barely out of the strip-tease stage. All he knew was to keep his mouth wide open for any manna that might drop in. The cedar waxwing was a demure damsel, a little gray thing with mottled breast, a decorative yellow band on her tail, and bright black eyes under an emotional crest that quivered with her genteel twitter of a voice. The four flickers were mad hatters from start to finish. Their heads bobbed, their tails jerked, and they kept up a raucous clatter that filled the air—a loud speaker system intended to keep their mother informed that they were starving to death.

**The young black-headed grosbeak had been a mournful and clammy mite with only a few feathers and sprouts and fuzz on its rear when it joined the family circle.**

But none of them had mothers now, and the joke was on us. It is a demanding job to bring up even one helpless wild bird from infancy — let alone six—unless you are exclusively devoted to that kind

of specialized philanthropy.

The first worry was food. When in doubt about babies, they say, feed mush. So mush it was for the main course. It probably should have been made of pabulum or wheat germ, but there was no such infant stuff in the house. So I made a stiff cream of wheat gruel, which, when cold, could be cut in thin slices and poked into red mouths. Hard-boiled eggs were mixed with this, a life-saver for any bird. A little later these were topped off with ripe raspberries, watermelon and wild huckleberries, especially for the choosy waxwing. She was so dainty that if the bite was a little too thick or too thin, too long or too sticky, she closed her mouth and eyes tight and fluttered her wings in a tantrum.

**The cedar waxwing begs for food. She was a demure damsel whose emotional crest quivered with her genteel twitter of a voice.**

The grosbeak gulped anything that came along and went back to sleep. When it came to the explosive flickers, it was a picnic. Their tongues are long, slender, black rubbery spikes covered with a sticky substance, and they dart out and lick up insects, or suck ant larvae out of holes in old trees. It was hard for these birds to acquire the idea of opening their mouths wide and have chunks of food slide down. But they did their best, guzzling and glugging at the top of their lungs. It was either extreme ecstasy or extreme excruciation, one could not tell which. Food for all six infants had to be served every little while, and since their stomachs worked by the clock, the alarm went off regularly.

The waxwing's door was always open and she became a "big sister" to the baby grosbeak, living with him in a comfortable wire cage with perches, cups of food and water. She edged close to him, chittering softly as if it were a lullaby. She watched him bolt his food, then cleaned the jam off his face and dressed his feathers. All of which soothed him to sleep. Once, when she was flying around outside, she lighted on the flickers' cage. A dagger bill darted out through the wires and gave her a nasty jab. "Take that, teacher's pet," it seemed to say. After that she ignored the boisterous flickers and did not like to have her cage near them.

When the flickers were out of the nursery stage and their door was opened one morning for their first taste of freedom, they all went wild. One scaled the stucco wall of the garage, "yarruping" at every hitch. Another reveled and squealed in a dust bath at the edge of the garden. The third one, a bright-cheeked male, started straight for the blue sky and landed in the top of a tall fir tree in a neighbor's yard—a yard infested with pet cats. The smallest one, a rather backward little female, sat under a bush near her cage and did nothing. I whistled the flicker call, but not one paid any attention to it. Some hours later, all four hungry rebels came whining home to be fed and put to bed in their cage.

They must have been tired and cross from their first flight, for, when all were hung up on the wires of their cage like bats, one got a little too close to another. Crack went a bill on his head. The other one jabbed him in the ribs. The grating tones sounded like "Quit your crowding! Can't you stay on your own side?" But soon all four heads were tucked back under wings, making them look like headless dummies.

The next day they came and went about the yard, perched in the apple tree above their old home spot, fluttered their wings and begged for someone to climb up and serve lunch. Soon they ventured farther away and their jubilant calls rang from the tall firs down the hillside. For some time, when I whistled the flicker call, it brought them back to accept from our hands the chunks of mush that never failed. They loved their wide freedom, but still were loath to sever their family bonds. The runt female came back at night as regularly as the sunset, and clung to the screened porch until she was let in, to hang up as she had done in her baby cage. One day the bold, venturesome male was missing and never again answered the evening call to come home. The other three, after their first run-away excitement, stayed about in the garden and orchard, chumming with their adopted folks. If either of us went out to work, one or another would come shouting to light on a shoulder for a ride.

As I was picking raspberries one morning, a couple burst down upon me, one on my shoulder, another on my arm. Soon I felt a long, soft tongue probing around my neck, and then (Continued on page 216)

*Solpugids are strange spider-like creatures called—*

# "Children of the Earth"

*By* VADA PACE WILDER

*Photographs by Tommy McKennon*

It was spring and I was a tenderfoot in the Rio Grande Valley, the spring rains and I having arrived at about the same time. It was that kind of weather that mildews the clothes in the closets. I had no slicker, all the dripping botanical specimens had thorns, and my Spanish was exactly nil. So I settled down to make the best of the dank situation. The rains continued, the vegetation grew by leaps and bounds, and representatives of practically everything that "creeps or crawls" began to move in with me to escape the disagreeable weather that reigned outside.

**The male solpugid or "child of the earth" showing the segmented condition of the abdomen. This fellow is alive but somewhat chilled since it was necessary to cool him off in the refrigerator in order to keep him still for photographing. He was called "Stumpy" because of his broken pedipalp, which shows well in the picture below. He had thawed out before this photograph could be snapped and had gotten into a distorted position.**

One night, to my astonishment, the place was suddenly overrun by the most extraordinary creatures. One minute they just were not there, the next minute the place was literally swarming. Examination proved them to be young solpugids—cousins of spiders. As my knowledge was limited to the study of museum specimens, I decided to capture a number of them for further observation. They proved to be the most elusive and unpredictable animals that possess eight legs. For a time I was afraid the game was going to end in a draw, but eventually I won. It was excellent exercise.

The following morning Beatrice, the Mexican maid, found two more under a floor lamp when she was cleaning. She informed me that the Mexicans call them *ninos de la tierra*—"children of the earth." Fortunately, Beatrice spoke excellent English and gave delightful accounts of their undesirability in the Mexican's scheme of things.

Under the circumstances, Beatrice's story that interested me most dealt with the bringing of ill luck into the household by "children of the earth." She was sincerely convinced that every solpugid found in my house represented some disaster. And as her accounts grew her value as maid in my household became less promising. Her chief aim became keeping

out of places where other uninvited guests might be in hiding.

The maid's accounts of these creatures whetted my curiosity, and, since it appeared that I was going to have to live in the same house with my new acquaintances, I decided to get all the information possible concerning them.

I found that solpugid is a term definitely unknown to the English-speaking people of South Texas, who commonly and falsely call these arachnids "vinegaroons." The Spanish-speaking element know them only as "children of the earth," some saying they are so named because of their burrowing habits. Being nocturnal, most of their activities are carried on at night, while during the day they stay pretty well out of sight, hiding under stones, rubbish, or burrowing themselves in the ground. In the winter months their activities are reduced to a minimum.

Starting with these first guests, my observations cover a period of two years, and are based on specimens from San Marcos, Texas; Mission, Texas; and what we call the "brush country" of Starr County, Texas.

Solpugids belong to the Order Solpugida of the Class Arachnida. According to the description given by Dr. Edson Fichter, members of my collection are most probably males and females of *Eremobates pallipes*. They resemble spiders in that they have four pairs of legs, and, in entomological terms, a fused head-thorax, chelicerae, pedipalps, simple eyes, and trachea. They differ from true spiders, however, in that the abdomen is composed of ten well-defined segments, and they do not spin.

The abdomen is somewhat harder and more elastic than that of the true spider. The chelicerae, or mouth parts, which are constructed for chewing, are controlled by large muscular lobes. In comparison to body size the eating equipment is enormous. Much is added to the sinister appearance of these animals by the two large black eyes, which occupy a prominent position in the center of the rounded, grayish head.

**When beauty was being passed around the solpugid was absent, as seems quite plain from this enlarged photograph of the head of the male.**

The highly developed six-jointed pedipalps are primarily sense organs, but are also used for climbing. In the end of each pedipalp there is a muscular cushion-like organ well concealed by heavy dark hairs. When an individual begins to climb, this cushion protrudes, grasping the surface like a sucker. This phenomenon has been explained as a probable "hangover" from the solpugid's life in the water. The last three pairs of legs are more or less useless in the process of climbing, although the last pair act as boosters. I have noticed that the smaller the solpugid the higher it can climb. The young of both sexes are good climbers; the adults are not so adept. A neighbor told me she had seen specimens of all sizes feeding in the tops of palm trees. Maybe so, but I have not. Another lady said she had seen them flying around the street lamps at night. Since they have no wings, that should be worth seeing. Of the two accounts, I will take the first.

For some reason, during development the first pair of walking legs have lost their locomotor ability. They are carried similarly to the pedipalps, off the ground and extended, giving an individual the appearance of having two pairs of feelers and three pairs of walking legs. The front legs are used for digging, for which they are well adapted. A digging "child of the earth" never fails to remind me of a digging dog. The respective techniques applied have a marked similarity.

There are ten curious-looking organs, sensory in function, on the under side of the last pair of legs—five on each leg. Because of their shape these are termed racquet organs. In silhouette they resemble more than anything else miniature toadstools growing out of the legs. There are two of these organs on the first leg segment, one on the second, two on the third. In the active animal they appear to protrude, but are partially collapsed in the inactive or dead.

"Children of the earth" grow quite large in com-

parison to our common spiders. Females grow to be two inches in length, that is, from tip of abdomen to top of mouth parts—not considering the pedipalp spread. True to "spiderdom" males are somewhat smaller than the females, and less vicious in both looks and behavior. The largest male I have ever caught measured one and three-fourths inches. In some species of the related spiders the females eat the males after mating. I have never seen this occur with the solpugids and hardly believe it does because the males are in the great majority. Mother solpugid is not above eating her husband, but the males of the species are quite capable of protecting themselves against the stronger sex.

The females are a light beige color, with legs and pedipalps ranging from chocolate brown to black. Hairs cover the entire body, but those on the cephalothorax and pedipalps take on a heavy bristled appearance. In the females, both fingers of the mouth parts have teeth. Males are more spider-like in that they have long thin legs and pedipalps, the tips of which are black. The gray body color makes an excellent camouflage with the soil, giving them a better chance for survival. This may account for their outnumbering the females. In the males, the upper fingers of the mouth parts have no teeth and are thin and beak-like. But true to sex, males have beards in the form of long tufts of coarse hairs attached to the inner side of the chelicerae.

**This female entered the house but wound up pickled. Her abdomen is distended with eggs. The photograph shows the lighter color of the female.**

Solpugids seem to prefer coarse sand or rocky soil to any other. They are also more in evidence during the spring months. In March, April, and May I bagged one or more practically any night I went collecting in the "brush country." Only occasionally could I find specimens in the same locality in other seasons.

Even though these arachnids inhabit hot dry regions they are not lovers of the sun. When placed in direct sunlight they show great resentment and try to escape. But rains will often drive them from their burrows, causing them to invade houses—or maybe they prefer to live in houses. Approximately a year after the first family came calling, another family of "children of the earth" took up quarters with me. One night I switched on the porch light and within ten minutes I counted twenty. They are naturally attracted to light as it is a source of food in the form of moths and other nocturnal insects.

After the female mates and is ready to lay her eggs she digs a hole in the ground into which she deposits between fifty and seventy-five tiny eggs, which hatch in about a month's time. All during the incubation period, and until after the first molt, the mother viciously stands guard over her children. She attacks anything that comes near. After the first molt the young become active, mother solpugid gives up her vigil, and the young are thrown upon the world. Babies are exact duplicates of the mother as they do not go through any stages of metamorphosis. For a time after leaving maternal protection they travel in packs. This fact prompted me to putting four young specimens in the same vivarium. Within an hour there was one little "child of the earth"—and three skeletons.

"Children of the earth" can be called interesting, unusual, or primitive looking things, but certainly not pretty. The external features make one think of something that was put together for the "scare element" in a medieval yarn. Besides ungainly bodies they have inherited terrible dispositions. One can well understand, after observing them, why they are put in the "bugaboo class." A bad disposition does not depend upon size, as one a fourth-of-an-inch in length is just as aggressive as an adult. The first desire when one is encountered is to escape, but when frustrated one may show considerable fight. They gnash their biting apparatus at anything that gets in the way, but their dispositions are worse than their bites. Other than inflicting a considerable wound, they are harmless. Apparently these creatures have a grudge against everything and go in a perpetual strut. This pose is largely because of the swift movements with pedipalps and fore-legs extended. Adults make a sharp clicking sound by snapping the mouth parts together. Often when I have tried to bag a victim, or irritated it otherwise, a white milky substance was discharged from the mouth. I have observed this only in the mature females.

Solpugids eat practically (Continued on page 220)

**The cubs eat a final meal proffered by the game wardens and before they set out into the dark woods in search of their mother.**

# Mollie of the Mississippi

*By* LEE MILES

**In this story Judge Miles, Little Rock attorney and former Arkansas Game Commissioner, pieces together the dramatic and true story of a mother bear and her cubs in time of flood. It paints a graphic picture of what happens to wildlife with the rivers on a rampage.**

One April morning a mother bear and her two cubs emerged from the swamps of the White River and stood looking out over the broad expanse of the Mississippi. It was raining dolefully, and had been for three days. The old bear was nervous. Head raised, she sniffed the various scents carried by the damp wind. The clouds were heavy, and it was almost dark under the low-spreading limbs of the oak beneath which they stood.

She surveyed the muddy, rushing current of "Ol' Man River," driftwood bobbing and plunging along its surface or circling in the fighting cross-currents of the rapidly rising flood. A weird groaning roar that seemed to portend danger mingled with undertones like the muffled croon of an old black mammy in a piny woods cabin, and the hisses of a thousand writhing serpents.

At times like this something calls to all wild creatures of the swamp that the rivers will soon be in spate; that safety lies only in flight. An old swamp negro once said: "All dese queer sounds you hears is de voices of spirits of animals drownded in de other floods. Dey is whisperin' a warning to de population what's livin'."

The mother bear read the signs aright. She had seen many floods before. With her cubs she moved along the river bank for some miles, then passed into Laconia-Circle, a region completely surrounded by protecting levees.

Soon, however, the yellow flood tore its way into the Circle from the river side. It came in great volume and soon the bears were forced to swim. Hogs, cattle and various wild animals were all moving westward toward the other levee embankment. They were carried like the driftwood on the roaring waters, their course directed as if by some invisible hand. Now and then some animal would climb out for a time on a tall stump, leaning tree, or jam of driftwood caught in the top of a fallen tree.

Deer, rabbits, and giant spiders struggled for life, together with wild hogs, raccoons and timber wolves. Cottonmouth water-moccasins vainly tried to climb

limbless trees. Minks went by clinging to broken limbs. The opossums are poor swimmers and few escaped that dreadful rush of waters. Some climbed into trees, there to remain and starve.

After short rests on temporary piles of drift, the old bear and her cubs reached the western levee. There, on the narrow strip of earth, were creatures collected from miles in every direction, for this was the only unflooded land still left in a vast forested area. Still the water continued to rise; the top of the levee narrowed rapidly. So the bear family left it and headed for Briar Island, ten miles to the northward.

**Mollie poses unwittingly for the camera of Dr. Bill Jeffett, whose insatiable curiosity forced him to go into the woods to see a reunion.**

Alternately swimming and wading, they finally reached a great hollow cypress stump where the mother built a substantial bed of grass and fallen leaves. Carcasses of domestic animals were easily found and she dragged some of these to the den for food. Before long the water crept into their comfortable retreat. Once more they had to move. Farther back in the inundated forest they found a large pile of driftwood, and there the wanderers established another abode.

The human population of this part of the low country of Arkansas lives mainly in shanty boats moored along the rivers. All of them have motor-boats. When floods come the men motor out through the swamps to see what they can find of interest. Some of them discovered the bear family. It was not difficult to capture the cubs, since they could not swim and fight at the same time, but the mother got away. The cubs were given a home on one of the cabin boats on White River, and there they remained until rescued by the game wardens who patrolled the river. Taken to town and fed until the waters receded, the youngsters were named Mollie and Tom. When the wardens spoke of the wild mother, somewhere out in the swamps, she was "Old Mollie."

While the two woolly children of the wilderness were in the haunts of civilization, they acquired a taste for food they had not before known. Cow's milk was one delicacy for which they developed the greatest liking.

When, at length, the flood water had passed from the forest and had gone on its way, the wardens took the cubs back to a region where it was hoped they might find their mother. There they were given a final supply of milk, and, like graduates fresh from college, were left to explore the world on their own.

Released on the bank of a small lake, the cubs plunged in and side by side swam to the opposite shore. Climbing out, they vigorously shook the water from their coats and turned their gaze inquiringly across the lake at the officers, as if to say, "Aren't you coming?"

For a time they milled aimlessly about the shore, and then slipped into the jungle of vine-clad timber lands. The flood area was still soft and muddy; the logs, the fallen leaves and the bare places everywhere covered with slime and mud. Water still filled the low places. Dead animals made a sickening stench. Muddy rings were high on the trunks of the trees; undergrowth and lower branches were as though singed away with a mighty torch. It was a scene of utter desolation.

Late in the afternoon the wanderers came upon a small pool filled with stranded fish. Dinner captured and stomachs full, they sat together for a time and peered out into an opening of the swamp. A pair of blue jays overhead flitted from branch to branch, eternally shouting a strange, wild story. A gray squirrel climbed down the side of an old gum tree and chattered at them. A collection of turtles sat on a floating log near-by, stretching their necks in curiosity. Long-legged white birds waded in the shoals of the lake, at times lifting their heads to swallow a fish. In front of the cubs were the bones of a mammoth moccasin, curved in the shape of the letter S. It, too, had perished in the flood. A little farther away lay the bloated form of a wild boar, and stationed about it at regular intervals were a dozen vultures standing like pall-bearers engaged in solemn ceremony.

Then the evening closed in, and only on the tops of the tallest trees could the sun's rays be seen. Already it was dark on the ground underneath the heavy foliage. Day creatures had gone to roost or rest for the night. Other life was astir. An owl in a distant tree called inquiringly, "Who-Who-Who comes there." It was answered by another, near-by. Then others called from a greater distance. A whip-poor-will sat on the limb of a blooming dogwood and sang his love-notes to his distant mate. The filthy atmosphere was filled with the ceaseless chanting of katydids and the spooky warning of tree-frogs. Millions of hungry mosquitoes filled the air as they set about their task of tormenting every creature they could puncture with their powerful apparatus for biting.

All these sounds must have been like notes of welcome to the little wanderers. Yet the comforting presence of mother was lacking, and at times it must have seemed that the night was filled with the cries of lost souls that flitted unseen in the darkness like ghosts in the wide spaces of the desolate swamp. The voices that called and sang came like a requiem for the souls of their departed comrades.

The cubs aimlessly wandered on in the darkness, guided by thought of mother. They, of course, could not know that she had ranged the forest far and wide in her search for them, and that she was now resting in one of the numerous cane-brakes. Just before daybreak they found the cold trail of a bear. With much difficulty they followed it. The sun thrust its rays through the cracks of the thick tree-tops and lighted up the mucky swamp, aiding the trackers as they followed the trail that wound in and out among the trees.

* * *

Some twenty-five miles north of the spot where the game wardens liberated the cubs, there lives a gentleman known to hosts of friends along the banks of the Mississippi as Bill Jeffett. The Helena, Arkansas, telephone book records him as Dr. W. F. Jeffett. He is one of the most kindly of men, and might have been one of those to whom David Harum referred when he said, "There is as much human nature about some folks as there is about others, if not more." Also, he is very much like the old scout and trapper, Jim Bridger, led by his "tormenting curiosity." Frequently he is seized by an intense desire to know the answer to questions about events that may be taking place in the wilderness. Bill knew about the cubs, and was eager to know whether they would find their mother. He decided to find out. All he had to do was to tramp around over a million-acre swamp, find a female bear with two cubs, see them before they saw him, and then watch their behavior to find out if they were Old Mollie and her cubs.

As Major Jeffett, Bill once had passed a busy time in the Argonne, and when now he has to put on his uniform for formal occasions he finds to his disgust that he is supposed to wear a lot of military badges and medals that were given him for bravery and such. Quite apart from his record in France, Bill's friends know that he is brave in many other ways, such, for example, as going alone into an interminable Mississippi Valley wilderness.

Daylight on Sunday found Bill already in the swamps, twenty-five miles from home. He had an old hound, Kate by name, that would trail a bear. His first impulse was to take her to help locate Old Mollie. But he decided against this and tied the dog to a tree. He knew there was scarcely a place in the swamp where a bear could go and not leave a track, and as long as there were tracks, he was as good a trailer as Kate. In his search for clues he covered a great area of the swamp. Finally he came upon a bear's tracks in a broad strip of open glade lying between a lake and a cane-brake ridge. The bear had been feeding on the numerous crawfish that were busily engaged in the reconstruction of their mud-houses. The tracks were fresh, and, of course, might have been made by the bear he was seeking.

With his camera ready and with curiosity sharpened, Bill climbed into the low branches of a hackberry from which he had a commanding view of the crawfish territory. He felt sure that the bear would return. Soon he was rewarded. Slowly it came forward until close enough for him to take its picture. Bill watched it feed for a short time and then disappear into the cane thicket.

Although he had seen no cubs, his curiosity would not let him climb down and go home. So he remained in the tree until the middle of the afternoon, when the bear again appeared. After feeding for some twenty minutes, during which it gradually approached Bill's point of vantage, it suddenly paused and threw up its nose, sniffing. It looked intently toward the cane thicket. Then it raised itself on its hind feet for a better vision, watching the thicket. There was a movement of the switch cane, and two cubs emerged. They saw the old bear and came on to within about thirty yards. There they stopped and gathered up their legs for a quick retreat. The old bear gave a call—a nasal cry—and the cubs came with a rush. Old Mollie and her children were reunited.

Clearly the mother was excited, but kept watching to see if the cubs were being pursued. She must have remembered the chase that had ended with her losing them. Soon her suspicion was relieved and she responded to the affection of the young ones. They climbed all over her with delight. After some minutes of joyful reunion, Old Mollie slowly ambled toward her home in the cane thicket. On one side of her was Tom, and on the other Little Mollie.

That night, while the owls, whip-poor-wills and bullfrogs called, the cubs may have tried in their own little bear way to tell the mother of their strange adventure. Finally they settled down beside her and went to sleep.

Up in Helena, Bill also was sleeping. His "tormenting curiosity" had been soothed and satisfied, and for a day or two it would allow him to rest.

## Rear Guard

*By* H. A. BOLZ

Although it's a fact that he'll seldom attack,
The skunk bears offensive defense;
It's during retreat that he metes out defeat
By force of remarkable scents.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

# The Planets in April

*By* ISABEL M. LEWIS

In view of the special astronomy insert in the center of this issue of the magazine we are confining the regular astronomy article this month to a discussion of the planets visible in April.

This is the most favorable month to observe Mercury in the evening sky. It will be at its greatest eastern elongation on April 12, when it should be seen about 15 degrees above the western horizon directly after sunset. It will be about equal to Capella or Vega in brightness, and should be found easily, even in fairly bright twilight. It should be visible for a week or more preceding and following this date, but it will be at its greatest elevation above the horizon on April 12.

Venus is not well placed for observation this month as it is now drawing in toward the sun in the morning sky, and thus is not in good position for study.

Jupiter continues to be the brightest object in the evening sky. On April 13 it ceases its westward or retrograde motion and begins to move eastward among the stars. It will remain a few degrees northwest of Regulus in Leo throughout the month. On April 30 there will be a daylight occultation of Jupiter by the moon. This should be visible with a small telescope. The planet will disappear behind the moon at 3:46 P.M. Eastern War Time at Washington and reappear at 4:59 P.M. The times and duration of the occultation will differ greatly in different parts of the country. On the Pacific Coast the moon will rise with the planet behind its disk.

Mars is now receding from the earth and decreasing in brightness. It is about equal in brightness to Aldebaran at the beginning of April. It will move rapidly during the month (Continued on page 216)

# The School Page

*By* E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

## SKY STUDY—SO WHAT?

IN THESE days of increased tempo, of crowded schedules, reduced man-power, and required quotas for almost everything we do, it is not inappropriate that school teachers consider the wisdom of including in their teaching some of those details they may have come to accept as standard. Not a few of the activities that pad a school program uselessly are associated with what is taught about the sky in night or in day.

This article is merely an attempt to suggest that teachers examine what they teach about the sky from at least two angles. First, is the material of such a nature that it can be truly significant to the student? Second, does the student recognize a real use he may make of it in the relatively near future?

If we apply these reasonable criteria to much of the standard content of sky study, we will find that much of the material should be discarded immediately. As with the song, "They're Either Too Young or Too Old", the material is either too hard or too dumb, from a practical standpoint, to justify much expenditure of effort. I venture to say that if most teachers would apply these criteria to much that they teach, they would find that really they do not have such a crowded program as they may have thought. In the sky study field, we find curriculum writers the world over being too erudite or too imaginative to be truly practical. Either they recommend the inclusion of too much insignificant detail about the atmosphere on the moon and the distances in interstellar space, or they spend all of their time in the field of mythology, and try to point out the resemblances of certain groups of stars to certain animals illustrated in the family almanac and represented in the signs of the Zodiac. It is highly probable that only a most insignificant number of people will ever need to know about the absence of air on the moon, and it is equally probable that most people—including a certain leader in Europe—would live happier and more reasonable lives if they did not allow the astrologers to advise them when they should get married, invest in certain stocks, or start a world war. In view of recent events, one wonders what style of neckwear is being worn by the favorite astrologers of the world's most infamous paperhanger.

### Impractical Material

If we would look through most of the texts available to elementary and secondary school children, we will find a dearth of material that can be considered immediately useful to children of those grades. We can find all about the distance from the earth to the moon, and from the sun to the earth, in material recommended for grades as low as the third. We can find it recommended that first grade children learn that the moon has no atmosphere, but I do not know of a single accepted elementary or secondary school science program that shows a lost child how he can use the moon to determine North, should he need help. To be sure, we find plenty of material on using the Big Dipper to help one locate the North Star, but usually this matter of orientation stops right there, and if the Big Dipper cannot be seen in its entirety, North presumably could not be located. It happens that the moon can be seen many times when few stars are visible because of a haze. It may even be seen in the daytime when the sun may be obscured by clouds, and if it can be seen, direction should be immediately and habitually significant to everyone, whether this is a sailor lost on a raft at sea, a tourist of 1950 whose helicopter comes down in a wilderness where there is no service station, or a plain outdoorsman who is fishing, hunting or hiking over the wide open spaces and wishes to make the most of time that is available to him. And what is true about locating direction by the moon is equally true about locating direction by the sun. I have tried to find an average teacher, out of more than two hundred with whom I have talked in the last week, who could look at the sun and make a reasonable estimate of where any given compass direction was. I and they failed miserably.

With the story of the moon, of course, the thing to remember is that the illuminated portion of the moon faces the place where the sun must be. Most teachers who have come to the conclusion that the sun is always to the East or the West, will be surprised, then, to notice, as I did the night this was written, that there was a full moon directly in the South, and that therefore the sun must have been to the North. Of course, this was observed at midnight when the sun was illuminating the other side of the world over beyond the North Pole from where I happened to be. Given the location of the sun and the time of day, compass direction should be relatively simple.

### Learn Moon Phases

Children, and adults, would do well to learn first to recognize a significance in the different phases of the moon and to get themselves set straight on what is meant by such terms as Full Moon, First Quarter, Last Quarter, New Crescent, Old Crescent, and so on. Before reading this article further, see if you can sketch right now how each of these moons would look and where it should be in the evening, at midnight, and at sunrise, and which of these moons would never appear at some of these suggested times of the night. I am willing to wager that there are more teachers who have worried about seeing the new moon over a certain shoulder, or who think they know what the character of a person such as the writer should be if he were born under the sign of Cancer, the Crab, or think that the moon may be a worthy guide to the planting of the garden, or who know reasonably well what a light year is, than there are teachers who can use the moon to find their way home if they should get lost. Of course, some teachers may view the moon under circumstances in which they would prefer to get lost than to find their way home, but even here it might be worth while knowing which way to go to keep from getting home too soon. What does it profit a lost person to know the distance from the earth to the moon, if he does not know how to get home?

For convenience, here are some notes on the different phases of the moon upon which teachers might wish to check.

The New Crescent (New Moon), in which the lighted rim is to the right, appears in the evening when it sets in the West.

The First Quarter of the moon, in which the right half appears lighted, rises about noon; if seen at sunset, it is high in the South; and it may be seen setting in the West at midnight. Note that when the moon is in the First Quarter, half of it appears lighted. Here is possible confusion on the term half and quarter for some children.

The Full Moon rises in the East at sunset; at midnight it will be high in the South, and it may be seen setting in the West at sunrise.

The Last Quarter of the moon, in which the left half is lighted, may be seen rising in the East at midnight; at sunrise it is high in the South; it sets about noon.

The Old Crescent, in which the lighted rim is to the left, appears in the East when it is rising—when?

### Moon Clues

The moon, of course, rises about 50 minutes later each night, and there are, roughly, seven days (Continued on page 219)

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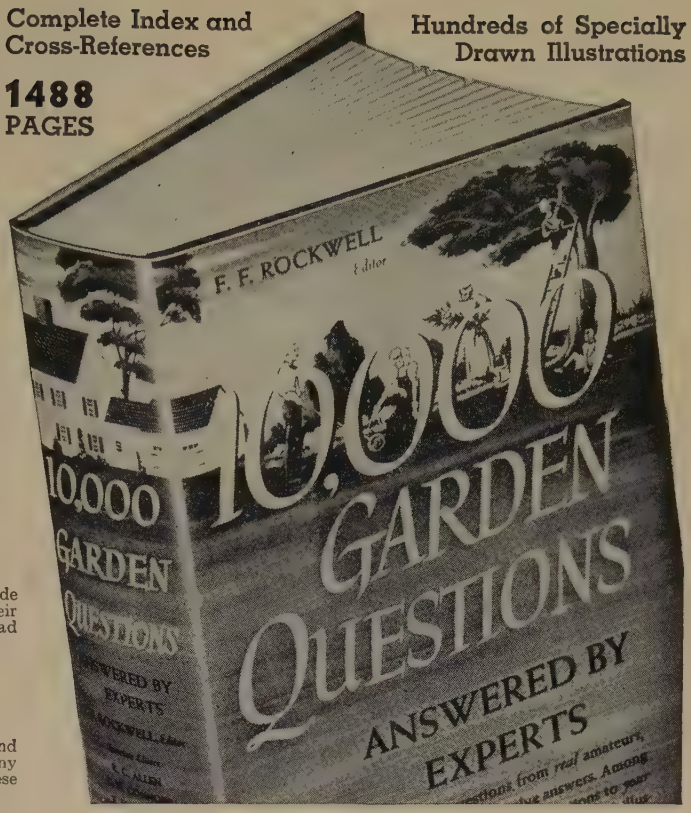


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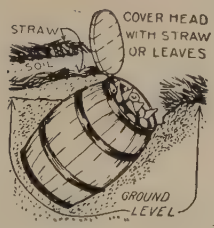
**ALEX LAURIE**
Professor of Floriculture at Ohio State University; internationally known authority on soil and its fertility; plant feeding, etc.

**—and many others equally well known**

These questions have not been merely devised to make a book. They are real questions, actually submitted by more than 23,000 amateur gardeners from all over the country. They are questions which *you* would ask if you had the advice of 35 experts to draw upon. They are questions which undoubtedly have puzzled you before and puzzle you right now! And they are answered by the most authoritative staff of experts ever assembled—the experts of the *American Garden Guild,* publishers of *The Home Garden Magazine*—the "Bible" of amateur gardeners. Hundreds of new, clear, specially-drawn illustrations supplement the text—and show you exactly "how to do it." In addition, there is a concise, practical background introduction to each division of the book, written by an expert! A complete index and many cross-references makes all the information instantly available!

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## WHAT MAKES YOUR GARDEN GROW?

(Contined from page 204)

cheapest kits, that sell for a dollar or so, because they cannot provide a thorough analysis. For five dollars, or thereabouts, you can get the materials for an adequate test of your Victory Garden soils. People in touch with a county agricultural agent or near an agricultural experiment station, can get an analysis made, either free or for a small fee. This is, however, not always as convenient as getting to know your soil yourself.

To sum up then: 1. Supply your garden with an abundance of plant food—see Victory Garden guides or directions supplied by manufacturers as to correct quantities.

2. Do not be too concerned about whether the plant food you apply is organic or inorganic, just so enough is applied at the proper times during the growing season. Those who claim that all the ills of the farmer (including insect pests) are due to the use of chemical fertilizers are as wrong as those who think that the productiveness of a garden can be maintained indefinitely by the use of only compost and organic manures originating in the garden itself.

There are two schools of thought as to whether it is the soil or the plant that is to be fed. Generally it will be found most practical to feed the plant, but building up the soil by a gradual application of surplus fertility, and, especially, organic matter to a point where there is an excess of fertility is a sound practice followed by most good farmers and gardeners.

Remember that a soil rich in humus tends to hold fertility. Furthermore, the acids created by the bacterial action in the humus tends to release valuable chemical elements in the rock particles of which the soil is composed.

Remember, too—and this is an important point—that when soil bacteria attack a green manure or cover crop that has been turned under, there is need for lime to keep the soil sweet, just as in a compost heap. Also, there is a considerable absorption of the available nitrogen in the soil. It is therefore a good idea to make sure that there is enough nitrogen in the soil to replace that used up in the rotting-down process before the new crop is planted.

Now we come to the most controversial point of all—deep versus shallow spading or plowing; or plowing versus disking; or merely stirring the surface, as Mr. Faulkner advocates, even with tomatoes. Personally, I favor spading to a depth of a spade slice—six to eight inches—unless the soil is very deep and has previously been deeply dug and supplied with rotted manure or other organic matter. The practice of deep digging, as advocated by English gardeners, who are among the world's best, is not generally practical or necessary in American gardens, except on estates or where special pains are to be taken, as for a rose bed, azaleas, and the like. We just *do not have the time or manpower* to do it that way in this country, desirable as it may be to obtain ideal conditions.

But, to answer Mr. Faulkner even more specifically, you cannot make a good garden without turning the soil bottomside up, and burying the fine litter that is on top. Moreover, seeding, cultivation, and weed control would be difficult indeed if the garden were not turned under. No doubt his methods are all right on the farm under certain conditions and with certain crops. But not in the garden. I challenge Mr. Faulkner to grow straight carrots, or long parsnips in a soil that has not been plowed. It just cannot be done!

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## THE BIRDS REMEMBERED

(Continued from page 206)

it darted into my ear and wiggled all around, hunting for ants or aphids, I suppose. The next minute some impishness seized him, and he reared back and commenced to hammer a hole in my head, as if it were a tree trunk that might conceal grubs or other delectable flicker bits.

In the deadly routine of the first stages of bringing up these baby birds, I sometimes became rebellious and considered it an imposition. Then I faced the music and told myself that I should not have accepted the responsibility of standing by these feathered orphans if I did not want to prepare them to go out into their world, and living their own lives. I knew that I could not have neglected them, let them suffer and die. When they were gone, I missed them. I found myself opening the window, looking and listening. One day, seeing a speckled form with red cheeks busily turning over leaves down the hillside, I gave the old flicker call and was thrilled to see the preoccupied bird start and involuntarily lift, as if the sound brought back the memory of something in his early days. It was payment enough.

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### Ngagi Passes

Ngagi, who, with his companion, Mbongo, was captured by Osa and Martin Johnson in the Belgian Congo in 1930, passed away suddenly at the San Diego Zoo on January 12, 1944. Autopsy showed the cause of the gorilla's death to be coronary thrombosis, which must have been developing for several years. When Ngagi came to the Zoo he weighed 147 pounds. His weight at death was 639 pounds. In accordance with an agreement made at the time of purchase, the carcass has become the property of the American Museum of Natural History.

## THE PLANETS IN APRIL

(Continued from page 213)

but will remain in Gemini.

Saturn is now high in the western sky at sunset in Taurus. The rings of Saturn are now at their widest opening, and the planet is a magnificent object in the telescope. It is about equal to Capella in brightness and is pale yellow in color.

For those who may wish to plot the positions of the bright planets on the Universal Star Chart given in the insert, and note their changes in position among the stars during the month, we are giving the right ascensions and declinations on April 1, 15 and 30. Positions on intermediate dates may be easily estimated. How the positions are plotted on the chart is explained in the insert.

| | Right Ascension | Declination |
|---|---|---|
| VENUS | | |
| April 1. | 23 h. 19 m. | 6° South |
| April 15. | 0 h. 23 m. | 1° North |
| April 30. | 1 h. 31 m. | 8° North |
| MARS | | |
| April 1. | 6 h. 8 m. | 25° North |
| April 15. | 6 h. 40 m. | 25° North |
| April 30. | 7 h. 16 m. | 24° North |
| JUPITER | | |
| April 1. | 9 h. 20 m. | 17° North |
| April 15. | 9 h. 19 m. | 17° North |
| April 30. | 9 h. 21 m. | 17° North |
| SATURN | | |
| April 1. | 5 h. 22 m. | 22° North |
| April 15. | 5 h. 27 m. | 22° North |
| April 30. | 5 h. 33 m. | 22° North |

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## HOUSING PROBLEM SOLVED

*By* DOROTHY RAY

Being the busy little housewife, I had washed and hung out to dry my husband's Airforce summer uniform. It faded very quickly if left out in the sun, so I glanced out the window often to reassure myself that it was still in the shade, safe from the advancing sun's rays. Several times I noticed a wee wren flitting around the jacket, but gave it little thought until I saw it, with a twig in its bill, perch for a moment at the armhole, and then disappear into the sleeve. Soon the tiny bird darted out and away toward the wood pile, returning quickly with another twig. She made several methodical trips, so I went out to investigate. The lower end of the sleeve was neatly filled with twigs, feathers and bits of string.

The owner of the jacket, informed by phone that he would have to purchase a new one, said to let the birds carry on with their home. He would rather wear a faded jacket than put them out in the street, and would decide on some plan

# What happens when your hat comes down?

SOMEDAY the War will be over.

Hats will be tossed into the air all over America on *that* day.

But what about the day after?

No man knows just what's going to happen then. But we know one thing that must *not* happen:

We must *not* have a postwar America fumbling to restore an out-of-gear economy, staggering under a burden of idle factories and idle men, wracked with internal dissension and stricken with poverty and want.

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*Let's all*

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to move them when he arrived home that evening.

As the sleeve of the jacket dried it opened at the bottom. The twigs were falling out as fast as the wrens could carry them in, so I went to the rescue with some clothes pins. The sun had been beating on the coat for two hours. Certain the wren was not watching me, and would not notice the difference anyway, I moved the garment a few feet along the line into the shade. Then I watched.

Almost immediately the bird flew to the exact spot on the line where the coat had been, and perched there questioningly. Her sharp little eyes darted back and forth. She scolded and chirped so excitedly that she had a dreadful time keeping her bit of string in her beak. Suddenly she flew directly at me and lighted on the back of my chair. Her wee beak was not more than an inch from my face and I wondered if she would begin pulling hair. How she did scold! Once or twice she dropped her precious string but would dart down, catch it in midair, and come right back to her perch to continue with her tirade. So I moved the coat back to its original position and my little friend popped into the sleeve before I had even finished pegging it on the line.

When Harold came home he built a house for the wrens and nailed it up on the garage. After some discussion we decided to move all their twigs and fixings to the ledge outside the door of the new house, hoping the wrens would discover it when they found their original home was missing. Even while Harold was still arranging their twigs outside the door, the wren appeared and began immediately to carry them inside. Our admiration was further increased when we picked a few twigs off the ground and placed them on the ledge only to have them tossed back at us. She carried one, which was particularly large, to the woodpile and neatly dropped it there. It is apparent they are not satisfied to use just anything handy, but demand a certain quality in their building materials.

Unfortunately Harold was posted to another town and we were not there to see the baby wrens, but I trust they found their lodging very cozy and became a happy family.


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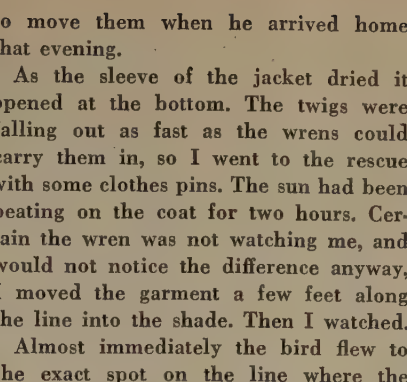


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GARDEN FOR VICTORY

LOOK FOR THE LEAF ON THE PACKAGE

# MOTHERHOOD EVERYWHERE

*By* BLANCHE MAYES ELFRINK

It is mild, almost summery in October in mid-eastern Alabama. Excepting the lavishness of summer heat, nothing seems to have been left behind. The roses are still in bloom. A carpet of green invites one's footsteps. There is no premonition of coming winter. Only the present with its soothing feel of soft, deep skies enfolds one. To be sure, the black walnuts are falling, but it seems natural for them to seek a more secure resting place than that of the swaying branches; and there are the chirping monotones of the crickets, but crickets do not confine their expressions of joy to just one season of the year.

On such a day I was sitting in the gallery of a gracious southern home in this valley of the Chattahoochee. James, the colored boy, was working in the rose garden. He had nurtured it all the summer, making the soil deep and mellow and keeping the bushes perfectly trimmed. It was a circular garden, cut into quadrants by two intersecting diameters of Manila grass pathways, the whole having been marked out with geometric precision. It looked as if it might be lifted in toto and placed on the front of a giant flower book. This morning he was cutting out the small brown stems that said plainly enough that their days of usefulness were over. He was working carefully, almost tenderly, bending quite near to the bushes with the attitude of one who must show perfection in everything he does.

Suddenly he stood erect, then walked quickly to one corner of the yard. Something had fallen with a thud beneath a great oak tree. In response to another thud he sprang backward and gazed with some agitation at what lay at his feet. I hurried to share his discovery. Two baby squirrels had fallen from their nest, which was high above in the topmost portion of the tree. He took one of them up in his strong hands and stroked it gently, while it uttered small, shrill, barking cries for help; then, with sudden intuition, placed it on the ground and returned to the rose garden.

I retreated in humility to my seat in the gallery.

The mother squirrel made no sound. She stirred not a leaf in the tree top. I marveled that she had learned the security of silence, the wisdom of restraint. After a time she crept noiselessly down the gray-brown tree trunk, her tiny feet clinging to its rough bark, and peered cautiously about; then turned quickly and ran up and out to the tenuous tip of a long branch. There she paused as if measuring distance, then leaped in a sweeping curve to another tree. With quick, short runs—like roulades in music—she went here and there among its branches; sometimes clinging face upward to the under surface of an especially inviting foothold; intermittently springing from branch to branch—never missing her mark—until she had visited each leafy compartment. How sweetly fragrant they were and how peacefully remote from the earth below.

She must have a very secure nesting place this time!

In a like manner she reconnoitered tree after tree—one, two, three, four, five. And then, behold! At a far corner of the adjoining lot, quite set apart from the oak grove, she spied something. It was a box, high up in the crotch of the china-berry tree. It had onec been a pigeon's nest but had been long unused. There it was, worn gray by rain and wind, a perfect home. She scuttled across the intervening space—an adventurous excursion—ran to the edge of the box and looked in. Yes, it had been made just for her!

Then she retraced her steps. As cautiously, as noislessly as before, she crept to the ground, took one small squirrel by the nape of the neck and carried it swiftly upward into the protecting trees. It did not cry for help now. Did it feel no fear or did instinct keep it wisely silent while she performed her dextrous feats and placed it at last in the newly-found home?

Again she retraced her steps. Again, with no less caution but with an assurance heightened by achievement, she lifted the other baby squirrel in the same mandibular grasp. We saw it dangling in midair as she projected herself in graceful curves through open spaces from one bough to another. Again she reached the weather-beaten box.

An hour passed. By a circuitous route I found a sheltered place near to the new nest, to watch and perhaps hear choice bits of squirrel conversation. I was thinking of the essence of motherhood—that which makes it what it is (so my dictionary says). There must be a great quantity of it; so bountiful that one may partake of it as one does of the air or the sunshine and use it according to the magnitude of his sphere.

The mother squirrel had expressed all of its qualities except—

Suddenly I felt rather than saw a buoyant presence and turned to look. There she was, a small figure on the edge of the box in the crotch of the china-berry tree. She sat for a short moment in curled readiness, her bushy tail in air, silhouetted against the western sky; then with a bound she dashed for the oak woods. She had gone to get food for her young.

## Southern Florida

With attention directed toward the Everglades National Park project, and the complicating factor of the possible discovery of oil resources in the region, special interest attaches to the publication of *The Natural Features of Southern Florida.* This is the work of John H. Davis, Jr., and is published by the State of Florida as Geological Bulletin No. 25. Particular emphasis is placed upon the vegetation of the region covered, and on the Everglades. There are many pictures in the 311 pages of this book, and three inserted maps.

## Fisheries Study

A joint resolution numbered S.J.Res. 112 has been introduced in the United States Senate by Josiah W. Bailey of North Carolina, directing the Fish and Wildlife Service to present to Congress by January 1, 1945, a complete report on the status of United States fisheries. The survey would cover "the character, extent, and condition of all of the marine and fresh-water fishery resources and other aquatic resources of the United States, its Territories and possessions, including high-seas resources in which the United States may have interests or rights." Senator Bailey urges passage of the resolution to the end that the report may become the basis of a clear and complete program for the development of both commercial and recreational fishing after the war. The resolution authorizes an appropriation of not more than $20,000 for the study.

## Hitch-hikers

Insect pests and plant diseases can and do hitch-hike in packages sent home as gifts and souvenirs by fighting men in foreign lands, warns the U. S. Bureau of Entomology and Plant Quarantine. There is an unending stream of packages from military post offices. Some of these contain exotic nuts and fruits, and even plant cuttings. These may carry pests. Packing materials are also a menacing factor. It is difficult to keep up with all incoming parcels, and recipients of packages are urged to burn any packing material that comes with gifts from men abroad. We do not want any counterparts of the Japanese beetle or Hessian fly, the chestnut blight or white pine blister rust imported in this way.

## Child Guidance

*Encyclopedia of Child Guidance.* Edited by Ralph B. Winn. New York. 1943. The Philosophical Library. 456 pages. $7.50.

This is a collaboration of more than fifty psychiatrists, educators and social workers whose interests lie with children. While the handling of most of the material is designed to be of use to physicians, educators and others working with children professionally, it can be used also by the intelligent parent. Each subject, from "Ability" to "Wishful Thinking," is supplied with a bibliography of more exhaustive material on the question.

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(Continued from page 214)

from crescent to half (First Quarter); seven, from half to full; seven, from full to old half (Last Quarter); and seven, from old half to new crescent (New Moon). With these clues, a splendid variety of problems dealing with direction and time can be set by any teacher with a reasonable imagination. Let the children look for pictures of the moon in classic art, in popular magazines or elsewhere, and ask them to determine from what they see there what the time of day or night may be, and where the cardinal points of the compass would lie. Some may be interested in writing amateur detective stories, in which the illustrations of the moon indicate that the story told by the villain is a misrepresentation of the facts. These are but few of many applications of this idea that may start the practical-minded teacher off on worthwhile ventures.

When the teacher has exhausted these possibilities of moon study, a similar study of the sun may be taken up, and when this is over a few stars and constellations might be watched. Get the children to select some place where they can stand at reasonably regular intervals, and note the stars to be seen at a given point in the sky indicated by a church steeple or a roof gable. Let them sketch through some months the position of the stars seen at that point at similar times in the night, or at different hours in any one night. They will recognize that a "band of stars" passes over that point, and they should know that recognition of such a band was the key by which the early Polynesians, and other peoples, were able to navigate to remote parts of the world without the use of modern instruments now available to our sailors. It might not be unhandy for even our sailors of today to learn about this, since not a few of them will find themselves suddenly on their own without elaborate navigation instruments. If any teacher thinks that this sort of information is less important than that so commonly caught in the realm of mythology or of mathematical astronomy, I would be glad to publish his or her views in this column at some later day. Duly remember that our philosophy calls first for doing something or observing something real, in Nature, not reading something out of a book and then repeating it like a well-trained parrot, and with only a parrot's comprehension.

### Thank You

The little note carried in our February issue and transmitting the request of a Louisville, Kentucky, school teacher for an abandoned oriole's nest for the school Nature museum brought quick response. In almost no time at all she had three nests, two from New Jersey and one from Indiana. The children are delighted. We are not surprised at the quick response, such are the readers of *Nature Magazine.*


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## WHERE PLANTS AND ANIMALS RULE

(Continued from page 192)

and cure you. If you are not cured you will not dare admit it.

So the gods of the sea govern men. But the gods of the soil also have a good deal to say. So much, in fact, that they are largely responsible for the slow march toward extinction of the Yap native.

In the midst of plenty, the Yap farmer suffers from malnutrition—because of superstition.

A Yap chief gave us some breakfast.

"Won't you eat with us?" I asked.

"We never eat in the morning," he replied.

"Not until noon?"

"Not until night," he corrected me.

The reason is that if the farmer goes out to his farm with a full stomach the god of the soil will know that man cultivates plants only to devour them. To keep this a secret, a man must eat nothing till night. Then, fatigued, he often eats too much and suffers from indigestion. The high Yap mortality is credited partly to this abuse.

An offering of fruit is made to the god of the fields by the Bagobos of Mindanao. When sowing seed a clapper is kept sounding to please the god.

Not only the dirt but the stones have their jealous gods. On Yap possibly the strangest money in the world is used—stone coins varying from six inches to twelve feet in diameter. These coins have their value because they are believed to be the incarnation of a god who will be angry if such money as the Japanese is used. It is rather startling to see a villager struggling down to the store under a thirty-pound piece of rock to buy a can of tobacco. There is, of course, no easy flexibility of trade with such currency. Nor are these stones unique in being considered divine. Many spirits make their homes in rocks.

Trees, too, are the homes of vengeful spirits, and the plantation owner is much hampered in his work by many taboos. Before cutting down a tree, he must give the spirits several days' warning so that they may move to some other tree.

Americans complained because the "scorched earth policy" was not applied to the rubber plantations of Malaya and Sumatra during the Japanese advance. If native workmen had been ordered to cut down the rubber trees they would probably have refused—for the process would have made homeless vast numbers of spirits who would then have sought revenge.

When Micronesians are commanded by the Japanese to cut down a tree they whisper a little prayer in which they inform the spirits that the Japanese are to blame. The Mandelings of Sumatra, in the same way, used to throw blame on the Dutch Controller, saying,

"Spirit who lodgest in this tree, take it not ill that I cut down thy dwelling, for it is done at no wish of mine, but by order of the Controller."

The savage's taboos regarding food are often amusing to the stranger, but very serious to him. We offered a Yap chief some choice bananas.

"I cannot eat them," he said. "My wife is going to have a child."

Yap's expectant father may not eat bananas or turtle meat; or coconuts if they have fallen from the tree. If he violates these rules, the child will be stillborn!

Magical objects must be made of the right material, otherwise they have no potency. If you see a long comb projecting from the hair of a Yap islander, you know that he is one of the nobles. But the comb must be made of mangrove; there would be no nobility in any other wood. The necklace that shows a girl is of marriageable age must be of the lemon hibiscus. A palm leaf placed over a man's door when he leaves home will deter any thief from entering. A palm leaf put around one's wife will make her taboo to other men. No other leaf will do.

The god of the coconut is a stern dictator. He forbids that the proud Yap coconut tree should be made a common thing, violated by any person who chances to be hungry or thirsty. It must be reserved for one person alone, so each member of a Yap family has his own trees. When a child is born, two or three trees are assigned to it—henceforth no one else may eat the fruit of those trees. If there is too much for the child, the rest must rot.

It is so also with taro; each person has his own potato patch. If mine yields heavily and yours not at all, I throw taro away while you starve. Thus harsh is the rule of the plant gods.

With the land split up into tiny individual sections, some cultivated and some neglected, an efficient agriculture is impossible. And a balanced diet is out of the question.

Taboos make woman's work hard. Suppose a Yap housewife has six persons in her family. She must collect the taro or coconut for each person from his own bit of land, keep them separate, cook each lot in a separate pot over a separate fire! The spectacle of a woman running about her yard keeping six fires going under six pots is a sight to remember.

If the owner of a given plot of land dies, the land must be abandoned for one year. Nuts drop from the trees and rot. They must not be touched. They will be needed by the spirit of the departed until he gets his plantations going in the land above the sky. If they are stolen he will go hungry and will inflict terrible punishment upon the living.

Fear. Fear. Fear. Fear is the constant refrain of savage life. Dread of the gods of sun and moon, of wind and sea, of rock and soil, and particularly of man's closest and best neighbors, the animals and plants. Rousseau depicted the "son of nature" as free and happy. How many "sons of nature" had he personally encountered? The savage does not understand his surroundings. To be ignorant is to be afraid. Animism, which places a malicious spirit in every growing thing, is man's first effort to explain Nature. When man learns, animism fades, science takes its place. As his scientific knowledge grows, so grows his realization that Nature is his friend.

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## "CHILDREN OF THE EARTH"

(Continued from page 209)

anything, but are especially fond of red ants. Sometimes they are found at the entrance of an ant hill, gorging themselves. In some sections they are called ant-killers—a good name. They stalk their prey much as does the wolf-spider, creeping stealthily upon the victim, then, when within a short distance, giving a swift leap that ends with a meal—for the solpugid. Their usual feeding time is at night, but they occasionally venture out in daytime. When first put into captivity they eat ravenously, but after a time begin to refuse food and die of starvation in approximately two month's time.

To me the spider tribes in general are interesting and offer a delightful avocation, but "children of the earth" are my favorites. For one interested in Nature they offer much pleasure—especially when the rains will not permit activities in the open. They give me that urge which probably prompts people to go searching over the face of the earth, but here a world of wonders comes to me.

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## SEA-GOING MASCOTS

(Continued from page 184)

that it was going to be an anti-climactic operation, because he showed no desire to land and remained on board. Chips has a health record, identification card and, of course, a dog tag. He lines up for chow along with the rest of the crew.

With our fighting men scattered all over the globe a great variety of pets are being acquired. Sailors in Australia have cast covetous eyes on the appealing little koalas of that land, and are said to crave a kangaroo or two. The koalas, however, can live only on the leaves of certain species of eucalpytus tree, and those still surviving in Australia are rigidly protected. Kangaroos, even young ones, really would stretch the rules rather far. Mascots, however, will probably always be companions of American fighting men, for they are unsung heroes contributing their valuable bit to morale.

## Boys and Girls Week

An outgrowth of National Boys Week, inaugurated by the Rotary Club of New York in 1920, National Boys and Girls Week will be observed from April 29 to May 6. It will focus attention upon the problems of youngsters, give impetus to year-around programs of character-building activities, emphasize the importance of sound body and trained mind and stress the importance of the responsibilities of citizenship. The observance is sponsored by the National Boys and Girls Week Committee, 35 East Wacker Drive, Chicago 1, Illinois. Information about programs may be obtained from this address.

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## Wildlife Conference

The Ninth North American Wildlife Conference will be held in Chicago April 24 ,25 and 26. Headquarters will be at the LaSalle Hotel. Subjects that will be considered at this gathering of conservation leaders will include administration of public lands; programs for the future; private, state and federal cooperation; upland game; big game; commercial fisheries; waterfowl and sport fisheries. The meetings are all open and anyone interested in conservation is invited to attend.

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## Meteorology

*Meteorology Theoretical and Applied.* By E. Wendell Hewson and Richmond W. Longley. New York. 1944. John Wiley and Sons. 468 pages. Illustrated by charts and diagrams. $4.75.

Written by two Canadian meteorologists, this is a textbook for the study of meteorology and seeks to find a place between the extremes of recent publications in the field. The authors have found recent books either too elementary or too advanced for use in classes for beginners. Also they have felt a need for a text that will more closely integrate forecasting technique with the theory upon which it is founded. The appeal of the book is to persons studying meteorology for the first time, and to practicing forecasters who wish to brush up on the latest developments in the field.

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## Mice Manage

In the process of tearing down a barn on a cousin's farm in Ontario, Canada, reports Mrs. R. L. Clarke of Tampa, Florida, the nest of a field mouse with a half-dozen one-inch babies was uncovered. While the welfare of the family was being considered, the mother mouse took matters in hand. Each baby nipped onto her tail, on one side or the other, and she dragged them to safety. This happened during Mrs. Clarke's girlhood days but she has never forgotten it.


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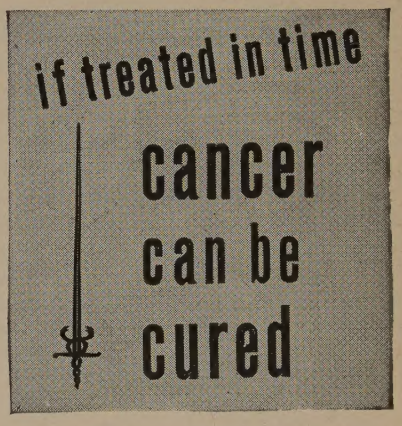


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# Under the Microscope

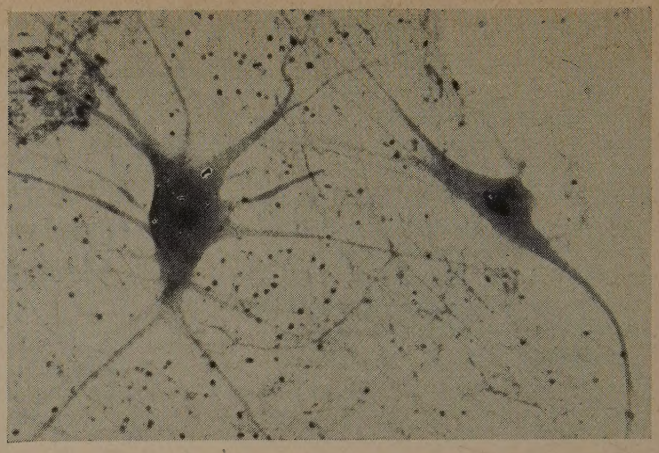
*By* JULIAN D. CORRINGTON

## INTRODUCTION TO NEURONS

From a number of standpoints the nerve cell or neuron (also spelled neurone), is a most compelling object for microscopical study. As a cell, the neuron may be of such unusual shape and relationships as to seem an impossibility; from the functional aspect, neurons make up tissues and organs of the nervous system, operating to convey information or commands, and to coordinate all parts of the body; psychologically, neurons comprise the physical basis of the mind, and make possible thought and emotion, normal or morbid. Human civilization is literally built by neurons; without them, animals would never have advanced beyond the sponge stage of development.

When we think of a cell, we picture something too small to be seen without the aid of a microscope; an object, moreover, that can be viewed in its entirety in a single field, as an epithelial cell, bone cell, or blood corpuscle. Certain examples are larger and can be seen as a whole only if the magnification is low enough, as a skeletal muscle fiber (actually a cell-mass) or yolk-rich egg cell. But what is one to think of a cell that has its nucleus in one place, yet its terminal, functional structure several feet distant?

With few exceptions, it is not possible to view an entire neuron at one time, and their study involves separate slides of whole mounts or sections by means of which we can piece together the various parts. This fact, with others, led to the former belief that the neurons must be a chain of cells. Observations of embryonic neurons, however, either in the body or growing in tissue cultures, show that the cell, originally epithelial, sends out processes and becomes extremely elongate. That part containing the nucleus is often called a nerve "cell," but "cell body" is much better, since the term cell should include the processes. These last are of two kinds, dendrites and axons (axones, neuraxon(e)s). Dendrites may number one or several; axons never more than one. Dendrites are centripetal or afferent, carrying impulses toward the cell body; axons are centrifugal or efferent, carrying impulses away from the cell body. It is important to note that a given process can carry an impulse in one direction only.

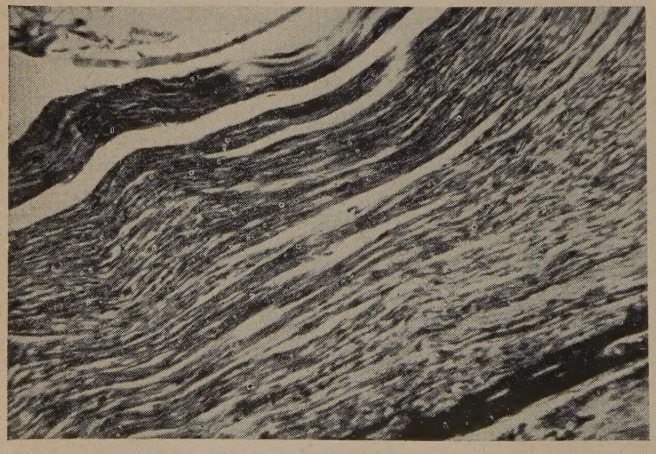


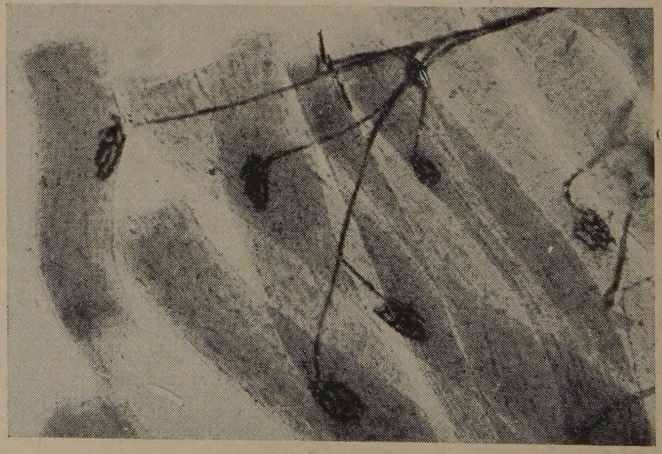
**Giant multipolar motor cell bodies, from the spinal cord of an ox. Magnification 280 X.**

Neurons are classified as to the purpose of the impulse, and best known because most usually chosen as a "typical" example of a nerve cell, is the voluntary motor neuron of the central nervous system (brain and spinal cord). Cell bodies of such motor neurons are stellate (star-shaped) or multipolar, with many dendrites that branch in tree-like fashion (dendron, tree) close to the cell body. The nucleus is large, clear, round or oval, and contains a single, prominent, eccentric nucleolus. These cell bodies occur in clusters, located in the ventro-lateral horn of gray matter of the cord, in sections of which they are conspicuous objects, with the processes cut off near their bases save in those infrequent cases where they coincide with the plane of sectioning. One of our illustrations shows a smear or whole mount of two giant multipolar motor nerve cell bodies from spinal cord of ox, a favorite study preparation for a three-dimensional picture of the processes; details of structure of nucleus and cytoplasm are obviously less clear than in sections.

The single axon proceeds as a naked (non-medullated, amyelinated) nerve fiber, and enters the white matter or outer layer of the cord. Here it receives a fatty coating akin to the insulation of an electric wire, known as myelin, and is then said to be myelinated (myel, marrow) or medullated (medulla, marrow, pith).

Each motor nerve cell body has only one such nerve fiber, although this fiber may give off side branches termed collaterals, and generally forks near its termination. The fiber passes out through the ventral or motor root of a spinal nerve where, in company with hundreds of its fellows, it makes up a nerve bundle. All of the fibers in a bundle are of the same kind, but a *nerve* may contain one or more bundles and, if more than one, they may be all alike, e.g., all motor (pure nerve) or





**Left, medullated nerve fibers, l.s., osmis acid; right, motor end plates in skeletal muscle. Both magnified 280 X. Photomicrographs from slides loaned by Ward's Natural Science Establishment, Inc.**

unlike, some bundles motor, others sensory (mixed nerve).

As the nerve fiber approaches the particular skeletal muscle that it innervates, the myelin sheath discontinues and the naked axon ends in a series of pads, the motor end plate. This subject must be prepared as a teased isolation by an advanced technique, but when successful, as in our illustration, it is a fine example of the microscopist's art.

Thus not less than three slides are needed to show the various parts of a motor neuron; cell body, fiber, and end plate. This form of neuron gives a command, as it were, carrying an impulse that causes contraction of a skeletal muscle fiber. Simultaneous messages over all the fibers of a motor bundle would bring about contraction of an entire muscle, thereby moving a part of the skeleton.

In later installments we shall describe sensory and association neurons, how the various sorts are hooked up into functional chains, and some of the techniques by which these facts have been discovered.

## HISTORICAL OUTLINE

The last three installments in this series have dealt with the long controversy over the academic question of spontaneous generation, and we are now able to consider some of the outgrowths of this argument, in both pure and applied science, with particular reference to their roles in the history of microscopy.

By far the greatest and most important of several unexpected results of this controversy was discovery of the nature and transmission of communicable disease, beyond question one of mankind's paramount problems. One has but to reflect for a moment on the terrifying incidence and heavy mortality through many centuries in Europe of such epidemics as smallpox, typhus, bubonic plague, diphtheria, syphilis, and others, and compare the conditions today; or contrast such treatments as bleeding or the administration of witch's brews containing herbs, brickdust, and dung, with today's vaccines, X-ray diagnoses, and preventive hygiene. Before the discoveries of Pasteur, physicians almost literally worked in the dark with their hands bound behind their backs, for nothing was certainly known as to the causes of disease. Without knowledge as to cause, no rational preventive or cure is possible.

How strange to read, then, that the fraternity that arose with bitter denunciation of Pasteur and his preposterous microbes was that of the physicians themselves! We usually expect the priestcraft to be the scapegoat in all such warfare, but others, including scientists, can be just as dogmatic and reactionary and, in addition, be riddled with professional jealousy, a human but a thoroughly unscientific trait. Pasteur was not a physician, therefore he had no business having anything to do with disease; what does a layman know about causes and cures of diseases, anyway? All his life Pasteur had a fight on his hands—with the great chemist Liebig over fermentation; with physicians over his germ theory of disease and his immunizing sera; with the law over his daring to practice on a case of rabies without a license; with his own health, and with his political and religious views. But he won his fights and lived to see complete and enthusiastic acceptance of his proofs, general acclaim as a great scientist and humanitarian, and to serve as first Director of his own Pasteur Institute, erected by a grateful international public.

From scanty sources of information one is apt to get the notion that Pasteur formulated the germ theory of disease out of a clear sky, but a little search of the literature reveals the same story in his case as in all others; every man has his literary and scientific forebears, and no great discovery is the work of a single man alone. There were plenty of indications along the trail leading up to the great Frenchman, if physicians and laboratory scientists of the several periods could have had the wit to see and appreciate them. For instance—

There was Varro, a Roman who, in the first century B.C. said, "Certain minute invisible animals develop which, carried by the air, may enter the body through mouth or nose and cause serious ailments." (Swingle.) There was the Italian physician, Fracastoro, who in 1546 proposed a "contagium vivum," or living cause for disease, as well as "seeds" of disease that he termed "seminaria prima" and which he believed transmissible from person to person, through contact or at a distance. There was the Austrian physician, Marcus von Plenciz, 1762, who even postulated a separate organism as the cause of each kind of disease. As Rice states, "Neither of these men had experimental or reliable objective evidence of such forms of life, for the very good reason that there was then no means for obtaining such evidence." This is true enough for Fracastoro, but hardly for Plenciz, inasmuch as bacteria had been discovered some time before his day.

As previously recounted, Leeuwenhoek, 1683, is the recognized discoverer of bacteria. There is a possibility, however, that the Jesuit priest, Athanasius Kircher, saw bacteria in 1671 or earlier. He examined such substances as blood, pus, water, and described "invisible worms" (vermicula) which he thought might cause disease. His descriptions were too inaccurate to make us certain that he saw bacteria, but he had more evidence than others, having observed his vermicula in putrefying substances and the blood of plague victims.

These are far from being the only instances in earlier times; they have merely been selected from a large number of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similar cases as being best known. Coming down to the era of Pasteur, we find Schoenlein, in 1839, proving that the infectious skin disease called favus was produced by a fungus-like organism. In 1840, Jacob Henle, German pathologist, stated the germ theory of disease practically in its modern form and he, not Pasteur as generally credited, is the actual author of this vastly important pronouncement. He also established the postulates needed to prove that a given organism causes a particular disease, a set of rules usually ascribed to Robert Koch and known as Koch's postulates. Henle thus anticipated both of the famous founders of bacteriology as a science. Pollender, 1849, and Davaine, 1850, working independently, observed the anthrax bacillus in the blood of sick animals and, in 1863, Davaine proved that these organisms caused the disease by injecting healthy animals with blood from sick specimens containing the bacilli, and thereby transmitted anthrax. In 1876, Koch managed to culture this organism and complete the proof of its causal connection with this dreaded disease, known also as splenic fever.

In spite of these and many other forerunners, Pasteur remains the effective father of the germ theory of disease and of bacteriology, while his young German rival, Koch, made the subject an exact science with his invention of refined laboratory techniques. More of these two, the great giants of this science, in later issues.

## APPLE POLISHER

MINOR REPAIRS: Anon comes final exams and Commencement time, and the idle frittering-about of the crass English or History teacher; but what of the Biology Slavey? Laboratories to clean up and set to rights; inventories of preserved crayfish and earthworms; additions of formalin or alcohol to preserved stocks and specimens; repairs to the right, repairs to the left. No rest for the weary (Well, you *would* teach Biology instead of Penmanship!). Microscopes should be gone over with care and put in perfect condition for the next onrush of neophytes. Here are a couple of aids in this business.

These instruments receive hard usage and even the best of them get out of kilter, particularly as to the parfocal adjustment; the inclination joint decides to balk or else run away; the rack and pinion of the coarse adjustment likewise may become too tight or too loose, the tube either sticking or refusing to remain where you put it. What to do?

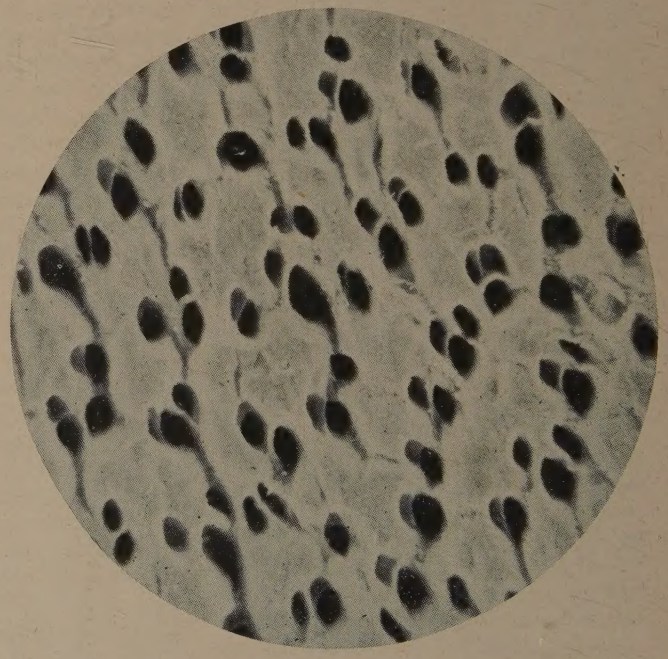
From the manufacturer of your microscopes you can get parfocalizing shims, paper-thin discs of brass, one or more of which is slipped over the threads of either objective, whichever focuses higher than the other and, unless the difference is very great, renders the instrument immediately parfocal again. Just unscrew the offending objective, slip on one shim, screw the objective back on the nosepiece, and try; if one shim is not enough, add more. Also from the manufacturer one may obtain an inclination-joint wrench, a simple turn of which sets that matter aright. For improper sliding of the tube, usually a partial turn, one way or the other, of one or both of the small screws that hold the rack to the tube will suffice; occasionally it may be necessary to use a shim of paper to raise the rack and make it engage more fully with the pinion. Anyone can make these slight adjustments very quickly.

Keep your microscopes clean and free from dust and never apply oil, as this will merely gum moving parts. More serious disorders, as broken lenses, iris, damaged fine adjustment, and the like, demand a trip back to the factory or to a reliable repair house. Remember the advice of all of the optical companies: you can take a low power (16 mm.) objective apart and clean various lenses, but never try to take a high power objective apart. If there is any evidence of foreign matter in the interior of such a lens, an exceedingly rare condition, send it back to the factory.

## TRADE NOTES

Speaking of neurons, as we did in our principal article of this issue, one of the best known texts of neurology is *The Anatomy of the Nervous System,* by S. W. Ranson. Revision for the seventh edition of this celebrated text was completed just prior to the author's death, and includes rewriting, new material, and rearrangement; neurologists need no further comment. For those not familiar with this book, the material includes a thorough analysis of all parts of the human nervous system; phylogenetic origin, embryonic development, and an explanation of the anatomy and histology on a functional basis. Case histories following various types of lesions afford opportunity for the reader to apply the information in practical quiz fashion. The many excellent illustrations are of great assistance in visualizing this difficult subject. There is a full atlas of sections, a laboratory manual, and bibliography. Pp. xii, 520; figs. 408. W. B. Saunders Co., West Washington Square, Philadelphia, 1943. $6.50.

*The Microscope and Its Use,* by Frank J. Munoz, technical microscope consultant, in collaboration with Harry A. Charipper, professor of biology at New York University, is designed as a small and practical work on the subject, in non-technical language, with numerous illustrations and a glossary of terms. This objective is well met insofar as the subject permits; it is, of course, impossible to explain any scientific field without introducing a host of technical terms, but the authors define each essential term carefully and hence explain without emasculating. Beginning with a brief history of the microscope, the modern compound instrument, with its several variations, is next described. Then come chapters on illumination, the microtome, use and care of the microscope, the stereoscopic, metallurgical, and polarizing microscopes, accessories, and common errors in usage. A special point is made of teaching correct employment of parts and accessories: i.e., how to secure Köhler illumination and when to use it, how and why to use immersion oil, and dependence of such action on numerical aperture of condenser and objective. Pp. xii, 334; figs. 129. Chemical Pub. Co., Inc., 235 King St., Brooklyn, 1943. $2.50.



## WHAT IS IT?

Do you like guessing games and puzzle pictures? Here's one for the microfan; a low power photomicrograph of a familiar subject, yet one not often seen in magnified view. So see what you can do about this, knights and ladies of the fine adjustment; then await our next issue for the solution.